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Corporate Governance and Cartel Formation

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Corporate Governance and Cartel Formation

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I hereby declare that the materials contained in this thesis have not been previously submitted for a degree in this or any other university. I further declare that this thesis is solely base on my own research.

Suha Mahmoud Alawi

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DEDICATION

This thesis is dedicated to my parents and my little princes Lamar who share this dream with me.

Abstract

A firm's participation in cartel depends upon the potential problems that may arise due to price fixing and the incentives provided to the management. The top levels of management such as the board of directors and the CEO are responsible for deciding if the firm will participate in the cartel and manage the corporate governance activities of collusive price fixing agreements.

This study aims to identify which characteristics of the participating firms' boards of directors and CEOs are associated with cartel formation. It analyses the empirical investigation of cartel participation of firms, taking into account corporate governance characteristics as such as board of directors' characteristics, ownership structure, CEO characteristics, and CEO compensation scheme. The study is focused on UK cartel firms which has the highest representation in the sample. A total number of 150 cartel firms in 52 cases from all around the world between the years 1990 to 2008 are involved in this study, of which 114 are UK firms. Therefore, this study is dominated by UK firms.

The challenge of this study is that the personal attributes of CEOs and boards can make a significant contribution to the risk profile of a cartel being formed. This indeed would be to 'diagnose' organisational culture in a quite radical direction. The study suggests and finds that some corporate governance attributes are associated with cartel formation. The results reveal consistency with prior researches, that cartel firms have different corporate governance relative to a control sample in the three years prior to cartel formation.

Specifically, the study concludes that UK-based cartel firms characterised by having larger board size compared to non-cartel firms; lower percentage of independent directors (non-executive); higher average of board remuneration; less likely that cartel is formed by family-owned and controlled firm (large shareholders); having older CEOs represented on the board; having CEO who served a less number of years as a director; less likely to have a female CEO represented; more likely to have CEOs who's combined CEO-chairman position; and a higher average of CEOs bonuses and compensation packages.

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ABBREVIATIONS

Ageba	Age of the board pre-cartel formation
Art	Article
BOSS	CEO concentration power
CC	Competition Commission
CEO	Chief Executive officer
CEOage	CEO age
CEOgen	CEO gender
CEOTen	CEO tenure
CONV	Convictions
Costa	Firm ownership status
CurrRatioB	Current ratio pre- cartel formation
DGC	Directorate General Competition
DoJ	U.S Department of Justice
Durba	Duration of the board pre- cartel formation
EC	European Commission
ECN	European Competition Network
ECSC	European Coal and Steel Community
EEC	European Economic Community
FAMCON	Family-owned and controlled firms
GENBA	Gender of the board pre-cartel formation
HHI	Herfindahl Hirschman index
Multidir	Multi-directorship
NED	Non-Executive director
OECD	Organisation for Economic Cooperation and Development
OFT	Office of Fair Trading
OLS	Ordinary Least Square
Outown	Common stock owned by outside directors
P	Proposition
PPER	Poor financial performance
R&D	Research and Development
Remun	Remuneration
Saleb	Sale pre-cartel formation
SIC	Standard Industry code
Sizeba	Board size pre-cartel formation
α $\beta 1$ β 2	Estimated Parameters

Chapter One

Introduction

'Effective competition is crucial to an open market economy. It cuts prices, raises quality, and expands customer choice. Competition allows technological innovation to flourish'.

— Directorate General Competition website, June 2005

1.1 Background

Firms have been carrying out collusive behaviour in terms of price fixing for many years; in the 1980s the antitrust authorities around the world started to pay more attention to these firms. The penalties enforced on the organisations worldwide exceeded $2 billion per year in the early 2000s. More than 40% of these penalties were settled in private suits. The remaining 60% were fines imposed by the European Union antitrust authorities and the US (Connor and Helmers, 2007). A cartel is defined as an association which is formed by independent firms to establish objectives in explicit agreements that would help them reap profits by either controlling prices or restricting the level of output (Connor and Helmers, 2007).

Not only does price fixing incline firms to join cartel but also management incentives, which help them carry out this decision (e.g., Levenstein and Suslow, 2006; Spagnolo, 2005). Collusive agreements are managed at lower discount factors when managers find that there exists a smoother path for profits and that contracts are able to achieve incentive provisions such as bonus plans, etc. (Spagnolo, 2005). Since high collusive profits are expected by shareholders, shareholders are ready to bear the high costs associated with the plan. It is also observed that in a classical model of repeated oligopoly, a positive correlation exists between the performance-based incentives of the top hierarchical levels and tacit collusive agreements (Buccirossi and Spagnolo, 2008).

Two issues have been found requiring attention in a cartel situation: The entry of new firms and the cheating possibility (Levenstein and Suslow, 2006). The financial statement of the organisation consists of all kinds of deviations that the firm may carry out as part of the collusive agreement. The partners in the cartel may start a price war if they find exceptional

earnings, and this activity may result in lower earnings overall. The antitrust authorities may also be alerted and the collusive agreement would be considered weak. Defection from collusive behaviour may not be attractive since the future costs are very high. Some of the firms may also enter the market and distort the existing collusive equilibrium. Concentrated industries are commonly found to have successful cartel that facilitate collusive activities (Bolotova, Connor, and Miller, 2008).

The management of the organisation is required to enforce cartel agreements (Spagnolo, 2005) and the decision to actually form the cartel is taken by the top management (Harrington, 2006c). The CEO, Board of directors and top management are all involved in the collusive price fixing agreements, which are formed by their firms as part of the corporate governance discussions. Hence, it is necessary to understand whether the corporate governance within a firm helps determine if a cartel should be formed. Many organisations may not want to carry out this hard-core activity and establish collusive agreements. Cartel participation increases if the board of directors is weak; if most power is exercised by the top management level (concentrated power); and if the incentives provided to the management depend on their performance levels (Spagnolo, 2005). The empirical literature has not yet established a link between cartel and firms' corporate governance characteristics.

1.2 Addressing the Problem

This study's primary objective is to examine the characteristics of the boards and the CEOs of firms involved in cartel formation. It is proposed that significant differences in the corporate governance attributes may exist between cartel and non-cartel firms, and that these differences might help to explain how corporate governance characteristics are related to cartel formation and discovery.

The independent variables reflecting corporate governance attributes are grouped in four different types: board of directors' characteristics, ownership structure, CEO characteristics, and CEO compensation scheme. A review of the corporate governance literature reveals several attributes. These attributes are selected based on any of the following reasons:

1. Corporate governance attributes that are proved in the literature to have a link with financial fraud.
2. Corporate governance attributes that are proved in the literature to have a link with collusion (Han (2010), Spagnolo (2005), Burhop and Lubbers (2008), Gonzalez and Schmid (2012))
3. Based on the agency theory perspective that will be illustrated in chapter three. This includes the internal monitoring by boards of directors (Fama (1980) and Fama and Jensen (1983)), and the use of NEDs (Fama (1980) and Anderson *et al.*, (1993)).
4. Corporate governance attributes that the review of the prior literature reveals a lack of research in them. For example age of the CEO and the board of directors.
5. Corporate governance attributes that are proved in the literature to have been associated with competition. This includes CEO compensation scheme (Spagnolo (2000) and Han, (2010)).

These attributes are used in this research to test the link between corporate governance and cartel formation. In line with the above illustration, the main research questions are:

- *Is there any corporate governance characteristics associated with cartel formation?*
- *Can appropriate policies and recommendations regarding a board structure be designed to reduce the probability of firms creating cartel?*

1.3 Research Approach

This research aims to find if there is a link between corporate governance characteristics and cartel formation in UK-based cartel firms. The cartel data set consists of 150 cartel firms, where 114 firms are from the UK. These firms have formed cartel and discovered in 52 cartel cases that operated in all around the world, and were found guilty by DoJ, EC, and OFT/CC between 1990 and 2008.

Several databases are used in the cartel sample selection and cartel data collection phases of this study. The ordered logistic estimation model is used to examine the differences in board characteristics, ownership structure, and CEO characteristics among cartel and non-cartel

firms, where Binary model is used to examine the differences in CEO compensation among cartel and non-cartel firms.

1.4 Contributions of the Study

This study links two literatures by studying the relationship between corporate governance and cartel formation.

Prior studies have examined the economic consequences of cartel formation. Various criteria have been applied to evaluate cartel performance (e.g. Levenstein and Valerie, 2006) including longevity (e.g. Dick, 1996; Simmerman and Connor, 2005; Levenstein and Suslow, 2010), stability (e.g. Porter and Zona, 1993; Villar, 1983, 1973 and 1999), social welfare (e.g. Bos and Pot 2012; Mott, 2003), and efficiency (e.g. Burhop and Luebbers, 2008; Dick, 1998; Günster, Carree and Dijk, 2011). However, only few papers have discussed cartel formation in relation to corporate governance. Specifically, previous studies focus on cartel formation in connection with compensation, CEO tenure and board characteristics (Han (2010); Spagnolo (2005); Burhop and Lubbers (2008); and Gonzalez and Schmid (2012)).

However, this thesis offers contributions to the literature by complement the empirical findings of Spagnolo's (2005) which are connected to this research. As Spagnolo documented that collusive agreements are managed at lower discount factors through smoother paths for profits. He has specified that price fixing and management incentives encourage firms to join cartel, which provide enlightenment to this research as it discusses corporate governance and cartel formation. The focus of his study is similar to this current study since both of them discuss compensation schemes (remuneration) as one of the characteristics of corporate governance. Spagnolo reinforces the influence of corporate governance on cartel formation as stated in his paper that to enforce cartel agreements is to require the management of organisations. Therefore, the current research is complementing the empirical finding of Spagnolo's (2005)

Furthermore, this thesis offers contributions to the literature by complement the empirical findings of Han (2010). Han examines short-term and long-term employment contracts and their effects on cartel stability. The study shows that firms are more likely to be involved in

cartel agreement when CEO tenure (short-term employment contract) is low or when CEO turnover is high. The author also shows that a short-term contract provides stability to a cartel formation more than a long-term contract. Therefore, the current research is complementing the empirical finding of Han's (2010).

Moreover, the most closely related study in this literature is perhaps the study by Gonzalez and Schmid (2012). Their research was conducted by using a sample of 1,148 observations from 1987 to 2009, in 182 various U.S. cartels. Overall, the research studied the link between possibility of being part of a cartel and financial controls, product market competition and several corporate governance variables. The corporate governance variables that they use in their study are; board size, CEO shares, block ownership, % outsiders, combined CEO-chairman, busy board and finally CEO centrality. The study found that there is direct involvement posed by the board of directors and the CEO in the potential collusive price fixing agreements of their firms, leading to an assumption of a significant relationship between corporate governance and cartel formation. However, in this research the focus on different board and CEO characteristics in addition to the one used by Gonzalez and Schmid, also this study uses to test the hypothesis dataset contain mainly UK-based cartel firms. Therefore, the current research is complementing the empirical finding of Gonzalez and Schmid (2012).

In an experiment conducted by Hamaguchi *et al.* (2009), gender was included as an individual or social background variable, in an experiment mostly designed to look for group size effects on cartel dissolution, along with leniency programme characteristics. The design of the research (which also proceeds by logistic regression), is very much alike the research pursued here in this study. There is certainly more attention being given to individual characteristics than ever before in the non-econometric analyses. The coefficient for gender in the logistic regression was significantly negative in showing that women have a positive impact on cartel dissolution ($p<0.05$), since "fewer men dissolved their cartels than women" (Hamaguchi, *et al.* 2009). Therefore, the current research is complementing the empirical finding of Hamaguchi, *et al.* (2009).

In many ways, this study is also complementing the work of Grillo (2002). Instead of focus on competition law and how market strategies are nullified by the "straightforward co-

ordination on market strategies", the focus of this research describes how multiple firms design and practice an organisational culture in a cartel arrangement, or what Grillo calls *"an anticompetitive object"*. This anti-competitive object can more easily be reproduced amongst certain kinds of boards and with certain types of CEO – this is the conclusion of this research. Therefore, the current research is complementing the empirical finding Grillo (2002).

1.5 Structure of the Thesis

The remainder of this thesis is organised as follows: Chapter Two discusses the definition and formation of cartel and highlights the four main players in cartel formation. It then discusses the theoretical framework on cartel formation. This is followed by a discussion on cartel damages and cartel accountability (individual vs. firm). Furthermore, this chapter reviews the factors facilitating cartel agreement and the development of policy under the three main jurisdictions used in this study: the U.S Department of Justice, the European Commission, and the Competition Commission /Office of Fair Trading in the UK.

Chapter Three will first look into the concept of corporate governance and the roles of the CEO and board of directors in corporate governance. In addition, it discusses the influences of corporate governance on market competition, and cartel formation. This followed by a review from the literature on the relationship between cartel formation and CEOs as well as the impact of cartel formation on shareholders. A discussion of agency theory shall be presented in tackling the concept of corporate governance and cartel formation. It will then identify the independent variables and justifies its utilisation in this research as proxies for corporate governance attributes. Finally, an overview of literature on corporate governance will be used to justify the inclusion of each independent variable and provide an understanding as to why these attributes may be associated with the incidence of cartel formation.

Chapter Four describes the sources of data and method of collection. It discusses how the cartel sample was obtained, including the two screening stages used to filter the initial set of cartel identified into a usable sample. The resulting cartel data are then compared with the initial sample and their characteristics are described in more detail. It discusses how the benchmark set of firms that have no known cartel participation was obtained, alongside their characteristics.

Chapter Five, which deals with methodology and empirical results, provides a presentation and discussion of the results using assembled data. It describes six boards, two ownership structure and eight CEO variables, as well as models, which depends on three environmental factors – the market environment, legal and regulatory environment, and internal control environment. Cartel and non-cartel sets are matched, and the analysis of board and CEO characteristics are being focused by cross comparison, controlling for other environmental factors.

Chapter Six, on the other hand, provides an analysis of the results reported in Chapter Five in an effort to address the research questions. It embodies a discussion of the findings as well as how ownership concentration takes place in cartel formation. It also tackles compliance code needs in cartel; and corporate anti-cartel compliance programmes.

Chapter Seven presents a summary of this research and draws conclusions and implications. This chapter also highlights the study's potential limitations and provides recommendations and avenues for future research.

Chapter Two

Cartel

2.1 Introduction

Cartel is a phenomenon, which have been extensively researched upon to understand their workings and their effects on society and economy. Many different kinds of theoretical models and empirical studies have been brought after extensive economic analysis in relation to cartel. It is found that a firm forms a cartel when it intends to purposely raise prices for the customers and eventually harm them due to an increasing expense.

Nearly all discovered cartel are operated and formed by managers (CEO/executives) whose motivation may not be fully aligned with those of the profit-motivated owners (shareholders). Even though participating in cartel may benefit executives and shareholders during their period in operation, once caught and sentenced, the effects of such behaviour can result in high fines and reputational losses on the part of the firm and its management (Agrawal and Mandelker, 1990). This thesis contributes to the theoretical basis by shedding some light on the characteristics of the boards and executives of firms involved in *cartel formation.*

This chapter discusses the definition and formation of cartel and highlights the four main players in cartel. Moreover, it tackles cartel accountability (individual vs. firm) and reviews the factors facilitating cartel agreement. Finally it examines the development of policy under the three main jurisdictions used in this study: the U.S Department of Justice, the European Commission, and the Competition Commission/Office of Fair Trading in the UK.

2.2 Definition and Forms of Cartel

Cartel is a formal agreement between competitors that attempt to restrict competition between them in order to increase profitability and/or maintain price. They are generally regarded as the most serious restrictive practices, especially ‘hard core cartel’ which are generally defined as agreements that fix prices, limit supply or output, share markets or rig bids (OECD, 2003). Successful price fixing usually requires more than price to be controlled. For example, in the

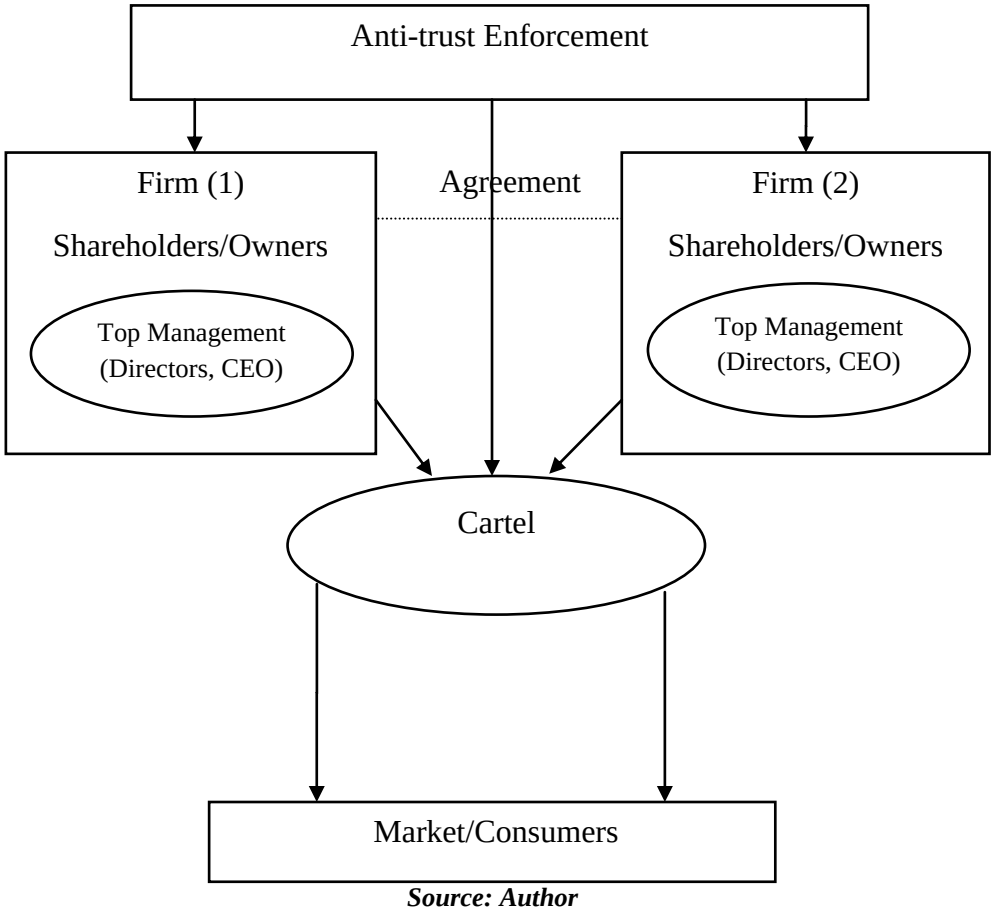
Citric acid cartel which ran from 1991-1995, firms agreed on a standard price and allowed to offer discounts to their key clients according to a market sharing agreement (Ellis and Wilson, 2003).

In addition, cartel formation can either be on an international level (e.g., the lysine cartel case) or on a domestic level (e.g., sugar cartel in the UK). Moreover, cartel can be public (e.g., OPEC) which is a legal agreement supported by the government, or private which is an illegal act viewed as violating antitrust laws in most jurisdictions. *In this research, the focus is on the private cartel, in its international and domestic levels.*

The four-tier hierarchy models below (Figure 2.1**)** demonstrate the cartel players: manager (CEO, director), owner (shareholders), anti-cartel enforcement, and consumer.

1. The management of the organisation is required to enforce cartel agreements (Spagnolo, 2005). The decision to actually form the cartel is taken by the top management (Harrington, 2006c).
2. Shareholders and/or owners of the firms are assumed to have objectives which are different from that of the management (Discussed in Chapter Three).
3. Anti-cartel enforcement is one of the pressures on the firms and the cartel agreement. An anti-cartel enforcement policy is a set of legal instruments to fight cartel and to protect fair competition in the market.
4. Market/consumers may be forced to pay a higher price for goods and services; or they might not afford to buy these products at all; and/or they might be forced to buy the products from abroad.

Figure 2.1: Cartel Players



Source: Author

2.3 Theoretical Framework

2.3.1 Oligopoly Theory

The field of economics state that when there are small numbers of sellers (oligopolists) in the market and these sellers are dominant enough to have an effect on the market structure, then oligopoly is said to be taking place. The firms and the players have knowledge about each other's actions as well as the ability to affect decisions.

The most well-known and most basic theory of oligopoly behaviour is called the *Cournot Model.* The Cournot Model is established on a very simple assumption that other market players will not change their amount of production. When there is oligopoly present in the market, there is a possibility of cartel formation. This cartel is an explicit and formal agreement amongst the competing firms of the industry regarding the quantity of production or the fixing of prices. Cartel may be formed in any industry, but it is realistic in an oligopoly

due to the small number of firms and due to its being bound by many anti-trust laws (Stigler, 1968).

Several issues arise due to the small number of players present in the market for a specific business situation. The theories and economic models cannot be developed efficiently since the actions of these players cannot be judged. These players are always acting at their best to carry out activities and strategies against each other in competition. Their activities may be of many kinds which involve coming together and performing in a perfectly monopolised market, enabling them to act as strong rivals and drive the price of the commodity towards a very low level (Stigler, 1968).

To increase power in the market, the oligopolistic firms form a cartel. This helps them work together as a group by stating the price that will be charged and the level of output that will be produced. Forming such a cartel helps them carry out monopolistic activities. A horizontal market price demand curve will be formed for firms that are in an oligopoly and sell an undifferentiated product like Lysine. If a cartel is formed by firms and the output and price are fixed, then the demand curve would then be downward sloping like that of a monopolist. The monopolist and the cartel usually have the same goal of profit maximisation. The output level determined by the cartel members is based on the level where the combined marginal cost is equal to the combined marginal revenue. The output level defined by the cartel helps maintain a market demand curve that identifies the cartel price. The cartel as well as the monopolists always chooses to maintain a perfectly competitive market where there is less output and high price level.

Forming a cartel presents itself with a certain set of rules that need to be efficiently enforced by the members. The members may not want to remain a part of the cartel and pursue their own interests since they could increase their levels of output and prices for profit maximisation. They could sell at a high monopoly price compared to the rest of the cartel members. If a small firm is part of the cartel and is contributing less towards the market output, then the price it manages is high and has the ability to provide full capacity production for profit maximisation. The cartel may always be at risk, but the firms enjoy the large profits they are able to attain (Stigler, 1968).

The classic framework put forward by Stigler (1968) states that for a cartel agreement to be formed and sustained, firms need to recognise their mutual interdependence. Moreover, they must see an incentive to cooperate, maintain the agreement, and avoid cheating, e.g., through some punishment mechanism.

Due to market conditions, the prices do not fluctuate for a small number of firms and they might be inclined to *cheat* in their cartel agreements. These firms are required to remain within the prices that have been set and sell the same product to the buyers.

The distribution of profits is also decided upon by all members which are part of the cartel. One method that could be used is to pool in all profits with the cartel managers and then receives equal dividends from this pool. Such an activity is usually observed by professional sporting leagues since they can share the revenues. The market allocation would be able to help decide on the distribution of profits for the cartel members. The members may receive shares as the market has been allocated to the cartel members in some specific way (Samuelson and Nordhaus, 2006).

2.3.2 Game Theory

Game theory tries to predict how people behave in strategic situations. In other words, game theory analyses the way that two or more players choose strategies that jointly affect each other (Brickley and Zimmerman, 2000).

Dixit and Nalebuff (1993), on "Thinking Strategically:" *Game theory means rigorous strategic thinking. It's the art of anticipating your opponent's next moves, knowing full well that your rival is trying to do the same thing to you".*

A basic game theory that shows the problems involved is the *Prisoners' Dilemma*, which assumes that the prisoner's dilemma is an imaginary position where two individuals are caught and are charged of carrying out a crime. The two prisoners are kept separately, and tries are made to encourage each one of them to implicate the other. In the event that neither of them does confess, each will be set free. This is called the co-operative strategy, which is available for both prisoners. To be able to induce one or both to confess, each one is informed

that a confession implication or a small incentive reward may result to her or his discharge. In case both admit, both will be jailed. Yet, if one of them implicated the other and not the opposite, then the implicated one will get a tougher sentence compared to each one of them implicating the other.

Several strategies used in game theory:

1. Dominant strategy: In considering possible strategies, the simplest case is that of a dominant strategy. This situation arises when one player has a single best strategy regardless of the strategy the other player follows.
2. Nash equilibrium (non-cooperative): Each firm considers whether to charge its high price or to raise its price toward the monopoly price and try to earn monopoly profit. The firms can raise their price in the hopes of earning monopoly profits. It is also sometimes called the non-cooperative equilibrium because each party chooses the strategy which is best for itself with no collusion or co-operation and without considering the welfare of the society or any other party.

2.4 Factors that Facilitate and Limit Collusion

Two constraints have been defined in theory for a cartel to operate successfully (Mott, 2007). First, the firms should be able to fulfil the "participation constraint" requirement. Second, the "*incentive compatibility constraint*" should be satisfied to ensure that the cartel is operating successfully. Once the "incentive constraint" is fulfilled, the "participation constraint" is fulfilled automatically. Violating the "incentive constraint" leads to the deterrence of the cartel, independent of the "participation constraint" (Buccirossi and Spagnolo 2006, 2007).
Thorough monitoring has been carried out by cartelists to ensure that the firms are not selling large quantities at the raised price since this would be unfair. If such behaviour is found, the firms would be penalised, and this punishment can aid in managing stability in the collusive arrangements. To sustain the formation of a cartel, two constraints need to be satisfied along with several factors that may help with its stability (Ellis and Wilson. 2003). Several market characteristics that contribute to cartel stability are discussed below:

1. **Presence of Entry Barriers:** If barriers to entry are kept low, then reaching agreements may be difficult for the industry. If any kind of competitive strategy is

being set, the low barrier to entry would attract new players to enter with their short term hit-and-run strategy. This would highly affect the competitive strategy of the players. The collusion sustainability may also be affected since the risk of future entry reduces retaliation issues. If entry occurs, the firms may have a less portion of profitability to lose. The firms may resort to deviation but the future entry prospects may not affect their short-term benefits. However, the costs associated with future deviation may be reduced since the profits would also tend to diminish.

If any new entries take place, profits diminish as a result regardless of how much the organisations may try to build strategies against them. The retaliation occurring against the deviating firm is also less significant if there is entry in the industry. There will be undercut of the collusive prices and the collusion process also declines.

An entry barrier has been defined as that aspect which reduces the threat of entry and allows the incumbent firms to reap profits above the normal levels (Bain, 1954). Large scale economies may be considered a barrier to entry if only the incumbents remain at the level of production and the new entrants believe that this level of production is efficient and will remain throughout to help maximise profit levels. If the incumbents start to believe that maintaining a lower level of production would help in increasing profits with a large-scale occurrence of entry, then the future entrants would also not keep their previous levels of output.

The opinion brought forward by Bain is rejected by Stigler (1968) since the latter believes that scale economies cannot be considered a barrier to entry. The researcher clearly stated that the costs which are borne by new players are the basic barriers to entry and these costs are not borne by those members which are already present in the industry. He states that the new entrants as well as the incumbents have the benefit of scale economies if the output is expanded. Hence, his definition does not state that scale economies are a barrier to entry and the two researchers have different opinions regarding this aspect. The antitrust lawyers and the economists have been posed with difficulty due to the conflicting definitions presented by the researchers regarding entry barriers.

Cigarettes and steel are a part of a collusive oligopolistic industry used by Bain (1949) to state his empirical evidence. To maintain short term profits, the price levels of the commodities have been kept at lower levels which would act as deterrence for entry and a limit price model. This limit price is the highest price which has been set by the incumbent firm to make sure that at least one other firm is able to enter the market. Before carrying out this activity, the incumbents make sure that they are clear about the competition levels that they would face along with the market share, which they would lose to the new entrant. The profits that have been estimated beforehand are compared to this limit pricing and not compared to the short-run profit maximising price, which could be set. The short-run prices which the incumbent firms want to set may be low since they want to reap the small profits all for themselves and maximise their levels of industry profit to keep the entry barriers high in order to discourage entry (Bain, 1949).

The limit pricing would help the firms manage long term profitability by letting go of the short term profits and for this purpose, Bain (1950) aimed to search for appropriate market conditions. One of the vital elements that were found was freedom of entry since if new players were to enter the market conveniently, and then the incumbents would not be able to reap short-term benefits easily. Three factors that may restrict entry freedom have been identified. First, patents may be used for production processes or the required resources be controlled. Second, production costs may be low for the incumbents as compared to the new entrants. Lastly, the economies of scale and the optimum firm scale may be large as compared to the market.

Barrier to entry has been defined as a that aspect which allows present firms to establish pricing above marginal costs, having monopoly in the market and making the entry of new players unprofitable (Ferguson, 1974). This marginal cost pricing does not allow long-term profits for incumbents since they would only be able to achieve them if prices were above-average cost, which usually does not happen due to competition. At the same time, Fisher (1979) states that if incumbent firm profitability is high, then entering the market would be difficult. The potential entrants may weigh the benefits of the society and the industry before entering the market. Von

Weizsacker (1980) highlights those costs as barriers to entry, which are borne by the new player in the market. This may cause a kind of distortion in the resource allocation of the society.

Entry barriers are usually formed to avoid new players to enter into the market and reduce competition levels (Gruca and Sudharshan, 1995). These barriers may arise due to industry characteristics and may require new entrants to bear certain costs in the form of expenses to compete efficiently (Kerin *et al.*, 1992). The incumbents are found to have many advantages, such as high level profitability (Yip, 1982) as compared to the new entrants due to these barriers (Nicholls, 1951; Porter, 1980a).
With the presence of these barriers, competition is likely to remain away from the market (Shepherd, 1979) along with creating a spill-over effect. This effect takes place when a firm enters the market without a low price and brand loyalty and the incumbent firm reaps the advantages since it already has these aspects (Karakaya and Stahl, 2009).

2. **Number of firms**: Cartel behaviour is more likely to sustain in industries where there are a few number of firms. The smaller the number of firms in the industry, the easier to manage and detect the behaviour of each other. Firms will get a better share of profits in a concentrated market when prices become higher, and the deviator's short-term profit is actually smaller as it started through a larger market share. Hence, the more concentrated the market, the larger are the gains from collusion and the smaller is the cost of co-operation (Bain, 1951; Stigler, 1964). A study conduct by Tirole (1988) finds that the smaller the number of market participants, the more the likelihood of collusion.

3. **Quality differences/product differentiation:** Forming a cartel also depends upon the type of products available, which may be homogeneous or differentiated. The existence of similar products - in case trust participants report a market share reduction - is justified through a quantity rise or a price reduced by firm cheating. Empirical studies have provided mixed results on product differentiation. Some studies state that in order to promote differentiation in the economy, many

organisations find it difficult to engage in collusion (Hay and Kelley 1974; Fraas and Greer, 1977); others find the opposite (Dick, 1996).

Raith (1996) finds that corporations at times cannot observe the efficient activities of their competitors and in these cases, it is better that they focus on the set of demands present in the market and work towards horizontal product differentiation. If the product is unique in the market, it is possible that the competition between firms become stronger. In this way, the deviations being brought forward may become difficult to detect and the deceiving process would be difficult to sustain.

4. **Seller concentration:** In general, established oligopoly theory is based on static equilibrium concepts and expects that a high degree of seller concentration in homogeneous product markets lowers the cost of managing common activities and therefore favours cartelisation.

   Similarly, some find that high seller and capital concentration facilitates collusion, but others find little or no impact of these determinants (Dick and Hay, 1996). Critical analysis states that there is bias present in the study relating to these aspects and that the focus is only on the most elaborate cartel formations. Dick (1996b) finds that in comparison with other export-oriented industries, the cartel formed by the American Webb-Pomerene kept the low seller concentration target and sold capital-intensive, non-durable and standardised products. They required growth in export industries, especially where the US industries had large market share. Jacquemin *et al.* (1981) studied 545 Japanese export cartel in forty sectors between 1960 and 1970. The four-firm concentration average ratio in these industries was 59.5 percent compared to a 62.7 percent average for all of Japanese manufacturing firms. However, collusion occurs in both very concentrated and very un-concentrated industries.

5. **Capacity constraint and excess capacity**: The part that capacity constraints play on sustaining cartel is unclear. On one hand, a capacity-constrained firm has less to expand from undercutting its rivals as it is able to accommodate only a fraction of the extra-demand this would generate. On the other hand, capacity constraints limit firms'

disciplinary power. This is because the strongest penalty that firms can expect is to produce at full.

A study by Brock and Scheinkman (1985) gives a great example of this unclear effect. Throughout a symmetric environment in which all of the firms within the market have the identical capacity constraint, the authors demonstrate that a non-monotonic relationship exists amongst cartel durability as well as the volume of the total capacity kept by every firm. Whenever the market capacity is sufficiently small, the actual change restraint effect of capacity restrictions controls, indicating that including additional capacity can make collusion tougher to continue. When market's total capacity is sufficiently large however, the penalty decreasing the impact of capacity constraints controls.

The punishment-reducing effect of the capacity constraint dominates its position when the capacity of the industry is large. In order to sustain the collusion, it is essential that the firms increase their capacity levels. If a firm has the ability to sell a variety of products, then the process of collusion becomes hard. The reason being that the profit generated from all these products is high and the market share is also higher than what it would be if the firm were in a monopolist position. A variety of products enables benefits to be reaped from deviation greater than the opportunity cost of the punishment (Symeonidis, 2002).

The cartel's sustainability has been viewed in terms of the asymmetries which are present in capacity and its constraints. The aggregate capacity, along with the asymmetry impact, has been viewed as a combined effect. Studies carried out by Compte (1998) and Brock and Scheinkman (1985) both indicate that when the capacity of production is large, collusion is favoured by the firm and if the production levels are low, then the asymmetric capacity hinders collusion. The literature present on this aspect is vague; however, many theories promote the use of excess capacity to support collusion.

6. **Buyer power:** An additional essential factor for cartel formation is the number of buyers in the market. Whenever firms set a price in secret, changes from cartel pricing

are much easier to identify if there are several small buyers compared to only a few large buyers:. Increasing the number of consumers increases the possibility that those last may communicate price reductions to competitors. Therefore, with a large number of customers, it is tougher to do secret price cut.

Snyder (1996) argues that the impact of occurrence of interaction upon the firms' capability to collude may be particularly vital in the presence of large buyers. This is because large buyers can strategically concentrate their orders across time in order to make firms' relations less frequent and consequently make collusion harder to sustain.

7. **Elasticity of demand:** The actual profits from fixing higher prices will certainly become higher the greater inelastic the market demand is. This is mainly due to the fact that the contraction in output essential to obtain the greater collusive price will be less; also the gains accordingly will be higher. Despite the fact that a low market elasticity of demand raises the probability of a cartel, it does not mean that a high elasticity of market demand indicates that cartelisation will not occur. This market elasticity is pre-cartel elasticity, presuming that the firms would not have substantial market power. Once elasticity during cartel is used, high elasticity may be consistent with the persistence and existence of a cartel since it has managed to increase prices closed to the cartel price; that is, high elasticity might be a proof of successful cartel (Snyder, 1996).

8. **Static or declining demand:** A cartel is less likely to form when demand is growing considerably because of the problems of disentangling those sales due to greater demand from those included by firm undercutting the cartel price.

Game theoretic models challenge the traditional view. When analysing the market, it is found that the trend in demand is cyclical and this assumption is considered a more realistic model (Haltiwanger and Harrington, 1991). When the demand for a product is high, it becomes easier for firms to conspire since the cost of punishment is low and the short-term gains are at high levels. The demand levels which are persistent and stochastic have also been researched. It is believed that collusion takes place if the period of boom is to last for a long period (Bagwell and Staiger, 1997). Within a

decline phase, if transitory shocks take place, it becomes very difficult to sustain collusion. When capacity constraint is present, the collusive prices change according to changes in the demand conditions. A collusive agreement may also destabilise if there are long periods of low demand (Staiger and Wolak, 1992).

2.5 Effects of Cartel Imposition

Distribution and supply agreements are part of the vertical agreements which have the ability to affect the welfare and competition in a positive manner. Firms form agreements which are to fix the prices or raise them to undermine the competition and carve the market or allocate market shares. Through this process, the customers are harmed and the firms which are part of the cartel have considerable advantage. Hence, the formation of cartel is prohibited in the competition law and referred to as hard-core violations. This law believes that such cartel reduce the levels of efficiency within firms providing them with an unfair advantage. Any negative aspects which are present against the competitors are suppressed within the internal workings of the firm. Competition is removed from the market which distorts the entire buying and selling process along with attributing pressure on the buying power of the consumers. Extra costs are applied, which are borne by the consumers along with the suppliers and the non-participating competitors. The fixing of prices at a high level or preventing the price erosion process makes the customers of the product suffer in terms of purchase prices. The firms which are part of the cartel may carry out the following activities which affect the customers.

Customers, suppliers, non-participating competitors and the final consumers are the ones who are highly affected by the imposition of cartel. When the purchase is made of the commodity, the effect of the cartel is felt by the consumer directly while other effects may be felt at a later point in time. Lost profits, interest and actual losses are direct effects caused by cartel. Market inefficiencies and several other structural effects may be included in the indirect effects (Van and Verboven, 2010)

2.5.1 Direct Effects

- **Actual Loss (Overcharge)**

Several losses are incurred when the competition law is violated and the overcharge concept is used to estimate these losses. The customers are affected by several kinds of dimensions and this overcharge is only a part of the entire cartel agreement which constitutes the lower end of the losses. Overcharge has been regarded as that difference which exists between the hypothetical price that would prevail in the market and the actual market price incurred during the cartel agreement. The loss incurred by a single firm is referred to as the price overcharge and is multiplied by the product quantity purchased during that specific period to attain the price effects during the cartel. It has been observed as a fact in the case law that overcharge is usually at the expense of the rest of the market participants and arise due to hard-core cartel performed by the firms.

- **Loss of Profit**

Restricting the output quantity is one of the activities of the firm's engagement in the cartel, which is why purchasers are subjected to additional damages. If competition is high, customers would be provided with large supplies of the commodity, which does not happen in this situation. Hence, the purchasers' profit is the amount he would save if the purchase was made at a non-cartelised price. The ECJ *Manfredi* judgment states that the damage head that takes into account the total exclusion of the loss of profit consists of the compensation which should not be accepted. Within the context of commercial or economic litigation, if the EU law is breached, the total exclusion of the loss of profit would not be able to repair the damages which have been caused [Cases C-295/04 to C-298/04, para 96].

- **Interest (Opportunity Cost)**

The interest that has been accumulated on the value of the loss is able to account for the damages that have been cause by cartel formation in the market. This interest may also be referred to as the opportunity cost or the chance that is forgone to invest. The ECJ *Manfredi* judgment [Cases C-295/04 to C-298/04, para 97] states that the damage caused and the compensation of the loss should not leave out factors such as time effluxion since it could also reduce the value. The award of interest should be regarded as an essential component of compensation according to the national rules that are applicable. With the help of this rule, it is possible to provide the sufferers with the real value of the loss. The EU law also requires

that the amount of interest should be paid from the time the damage occurred till it was actually paid off in full. According to the Marshall case, the amount of interest must be adequate in keeping with the loss that has been incurred. If there is any breach in the EU law, the payment should be made according to the national rule thus prescribed, which should be made in full [Case C 271/91, para 26]. A German Act has also been presented on the Restraint of Competition which states that on the day the damage takes place, the infringer is required to pay five percent above the base rate per year of the interest as an obligation for the damage that has been caused (ACCC Cartels, 2009).

2.5.2 Indirect Cartel Effects

- **X-Inefficiency**

The difference between the minimum and actual attainable average production costs is a gap which is referred to as the 'X-Inefficiency'. Since there is less competitive pressure, the cartel firms maintain high levels of production costs keeping inefficient players in the market. The R&D activities are reduced along with the improvement of technology. Hence, product diversity and improvement of product quality suffers; however, a high price is still charged in the market.

- **Long-Term Structural Effects on the Market**

Many competitors are forced to leave the market due to cartel formation since there is predatory pricing, common battle funds, increased costs of rivals, and several other damaging activities by the members. Common standards that have been set also create a barrier for new entrants. Hence, it is found that cartel have a long lasting effect in the form of increased prices and profits on the market and competition levels even after termination. The damage is also continued after it has been thoroughly analysed and fined for the activities performed.

2.6 Who is Accountable? Individual vs. Firm

Preferences and incentives are the two things that drive the decisions people make in an organisation. When an organisation is found to misbehave, it is usually said that it is not the organisation but the people who are part of it who should be held accountable. The people

who are part of the organisation have formed a relationship with the firm, which is based on contractual arrangements (Buccirossi and Spagnolo, 2007).

Individual accountability is an important concept to be introduced to apply social control in a society. Individual accountability is described as "each individual is held responsibility for his/her own behaviours and actions" (Wells *et al.*, 2011). They are required to provide an account of the behaviour or conduct that has been carried out and receive sanctions for this behaviour in order to progress further (Gereffi, 2011). This kind of accountability may be expected from either an individual or a corporation. It is not only limited to the actions of individuals. Corporations may be responsible for a criminal activity which requires policy regulations; it is also necessary to understand that not only may the corporations be held accountable for their actions but also individuals working within these corporations.

According to Wells *et al.* (2011), the corporations are usually subjected to antitrust prosecution, since it is believed that they have the ability to pay the fines. On one hand, these penalties and fines are intended to motivate organisations to control the behaviour of management. An organisation is vast with large numbers of personnel, so it can be difficult to find which individual should be held responsible for the inappropriate action (Becker, 1968; Elzinga and Breit, 1986; Posner, 1976; Landes, 1983; Posner, 1980). On the other hand, several arguments state that the punishment for individuals is easier to implement and owing to their knowledge of this, they are inclined to act correctly. If an individual in an organisation is being punished, it harms the reputation of the corporation since the incident would be publicly highlighted and the employee may also engage in whistle-blowing. If an individual is held responsible for his actions in an organisation, he would be inclined to discourage activities like price-fixing since it could harm his reputation and job security (Calkins, 1997; Evans and Hughes, 2003). The individual could also be subjected to penalties alone and held responsible for this action. Any third party involved would also be subject - whether an individual or a corporation - to penalties or fines.

Several cases have been observed where the corporation cannot be separated from the actions of the individual. In one hand, if an individual is being punished, he is found to protect his assets by combining them with the corporation. On the other hand, if the corporation is being punished, the individuals would want to save themselves by withdrawing their assets from the

organisation. If both the parties are being punished, it is possible that inefficient transfer of assets would take place. Hence, the two parties are more inclined to carry out behaviour that is consistent with the antitrust laws present in society (Calkins, 1997; Stephan, 2008b).

A research study by the Centre for Competition Policy is also presented, where it states that there are several reasons why corporate fines alone are not able to provide efficient deterrence of such activity. At first, fines are limited and they cannot be applied in a disproportionate manner. Secondly, it is the individuals who carry out such decisions in the organisation. Lastly, it is not the organisation that makes the individual to carry out such activities as price-fixing (Stephan, 2008a).

Furthermore, since individuals work as agents on behalf of the firm, it will make sense to prevent these individuals directly by frightening them through sanctions, also to enforce this kind of sanctions once they violate the law. Due to the fact that corporate fines rarely achieve a level that would likely increase their deterrent effects, they do not give enough incentives for the firm to effectively control and monitor its agents to prevent them from engaging in illegal activities and from placing the firm at the risk of getting fined for engaging in an illicit cartel. Besides, it is doubtful if a firm would at all times have the means to control and monitor its agents and prevent them from illegal behaviour (OECD, 2004).

If an individual believes that the organisation will be held responsible and be punished for their actions, this does not ensure that he or she would avoid such activities. The Competition Authority goes through a long process of imposing fines on organisations and during this time, the responsible individuals may have switched jobs or even retired. The stockholders who may have profited considerably from the cartel formation would also have sold their shares before being subjected to fines. When corporate fines are finally imposed on the organisation, it is the current employees and stakeholders that will suffer, not the ones who have left (Stephan, 2008b).

2.7 Anti-Cartel Enforcement Policies

The presence or absence of antitrust policy and the efficiency of their enforcement in a country impact the decisions of firms to collude or not. It also influences the level to which the market price can be increased if firms decide to form a cartel. Scholars have undertaken empirical studies of antitrust enforcement in the United States, United Kingdom and other countries around the world. Several measures of enforcement effort and performance provided by the Divisions have been applied. The literature review identified five key elements of an effective legal regime (OFT, 2009):

1. Fines (against firms)
2. Penalties (administrative and criminal) against individuals
3. Amnesty/leniency
4. Settlement
5. Private damages actions

This section discusses the anti-cartel policy development in the three main jurisdictions used in this research: the U.S. Department of Justice (DoJ), the European Commission (EC), and Competition Commission/Office of Fair Trading in the UK (CC/OFT).

2.7.1 The U.S approach (Department of Justice)

The Sherman Antitrust Act of 1890 (Gallo, *et al.*, 1994), which was the beginning of the U.S legislation to manage cartel, was the pioneer in recognising price-fixing contracts as criminal actions which were liable to economic as well as disciplinary sanctions. It officially declared the conspiratorial contracts shaped by rivals to restrict competition as illegal, stating that:

'[E]ach contract arrangement in the shape of conviction or else scheming, in limitation of business and trade...is to be illegal'.

Subsequently, the Clayton Act of 1914 stretched the US anti-cartel policy and identified the different types of behaviour to be regarded as illegal restraints of trade, including the most harmful type of cartel behaviour (Harding and Joshua, 2003).
§ 4 of the U.S Clayton Act, 1914:

'[A]ny person who shall be injured in his business or property by reason of anything forbidden in the antitrust laws […] shall recover threefold the damage by him sustained, and the cost of suit, including a reasonable attorney's fee.''

The Federal Trade Commission (FTC) was set up under the Clayton Act and its Bureau of Competition became the main federal body investigating and initiating proceedings against firms involved in unfair parasites. Eventually, the FTC began to share enforcement of antitrust laws with the Antitrust Division of the US Department of Justice (DoJ). The DoJ is empowered to file criminal cases against cartelists and from the late 1970s; it gradually adopted an increasingly tough policy toward cartel.

- **Firm sanctions**

Heavier sentencing was encouraged by the publication of sentencing guidelines in 1977 and revised guidelines in 2004 and 2007. Maximum corporate fines have been increased several times since 1974. Recognising the rising threat to U.S. businesses and consumers caused by cartel, in June 2004, Congress significantly raised the maximum punishment for criminal Sherman Act infringement increasing the statutory maximum corporate fine to $100 million (Hammond, 20005a).

Gallo and Goshal (1996) show in their study that every time the statutory limit was raised in the years 1974, 1985, and 1990, real average corporate fines afterwards increased many times. The statutory maximum corporate fine was raised from $1 million to $10 million in 1990 and to $100 million in 2004 (Connor, 2008).

- **Individual sanctions**

The legislative maximum prison time was unaffected for three decades, but individual fine levels were increased several times between 1974 and 2004. The maximum individual fine for illicit Sherman Act violations was increased to $250,000 in 1984, through a combination of the Omnibus Crime Control of 1984 and the Criminal Fines Enforcement Act of 1984.

In 1990, the Sherman Act was modified to raise the individual fine to $350,000, and in 2004 increased the statutory maximum individual fine again to $1 million, and the maximum jail term to 10 years (Hammond, 2005b).

- **Amnesty programme**

In 1978, the US Department of Justice Antitrust Division set up an amnesty programme according to which corporations or individuals could confess their involvement in illegal acts and could aid the department in investigation of those acts. This programme was quite lenient in its operations and led to the reporting of one case per year. This was amended in 1993 and is currently in action and doing quite well in enforcing actions against major cartel. According to this programme, a corporation could confess its part in illegal activities and could cooperate with the Antitrust Division in carrying out investigations of such cases. This amendment has led to an increase in the number of applications to 20 per year and the conviction of 30 defendants with the collection of over $1 billion in fines within the last two years. It was found that more than 90% of the convictions in antitrust cases resulted from plea-bargaining. The structure of the programme made amnesty automatic if no ongoing investigation was made before the application.

There is also a possibility of amnesty for those individuals who assisted the department in carrying out the investigation even if they came forward after the start of enquiries. Further, there is a possibility of a negotiated settlement at any stage of the investigation. In 1994, the programme was again amended to provoke individuals involved in antitrust violations to report to the Antitrust Division. Noteworthy immunity affects the data collected on sentences in this study. Therefore, the penalties seen are less than otherwise because of the existence of such policy.

- **Settlement**

Settlement and plea bargaining are methods used to help enforcement and reduce costs. Under the US regime, 90% of the antitrust cases are settled. A study by Lande and Davis (2007) reports that private cartel settlements is $8.2 to 9.6 billion since 1990 for both domestic and international hard-core cartel in the U.S.

- **Private damages**

For nearly a century, private enforcement of the antitrust laws through damages actions has played a key part in the development of US antitrust law. Under section 4 of the Clayton Act,

15 USC. § 5, injured partied can bring lawsuits against infringers and receive three times the amount of damage actually caused as a result of the anticompetitive behaviour.

- **Literature on penalty regime of the Department of Justice**

Next section discusses a number of studies to show the changes in the sanctions level over the years for both corporate and individual under the US Department of Justice (DoJ).

A study by Connor (2008) evaluates the effectiveness of the antitrust law of the U.S. to detect and deter cartel during the period 1990 to 2007. Connor shows that the number of cartel cases filed by the antitrust fell by 49%. The number of firms charged annually decreased continuously during 1995 to 2007. Yet, the penalties imposed by the Division on convicted firms have increased. The total amount of cartel fines imposed is $4.2 billion. At the same time, the amount imposed for private damages is roughly four times as large. In addition, it shows that the Division places great attention on the prevention of cartel by imposing high prison sentence for convicted cartel managers.

Table 2.1 below demonstrate the average fine from 1990 to 2007. There is a solid rising trend in corporate penalties, which in the early 1990s was an average of $28 million per year . From 1993 onwards the mean of the annual penalties has surpassed $300 million. Corporate penalties have averaged $560 million per annum in the period 2005-2007 - and between 1990 and 2007; corporate penalties per enterprise have also risen. It can be calculated that during the 1990s, the mean corporate penalties were increased 26 times, then experienced a decrease during George W. Bush's first term and finally, continued on its path of escalation during the four years of Bush's second term. This is supported by data that provide statistical evidence for the four sub-periods throughout which the mean corporate fine grew from $0.5 to $12.9, $10.2, and $36.8 million accordingly, and the average mean corporate fine from 1990 to 2007 is $7.5 (Connor, 2010).

Table 2.1 illustrates that the number of persons indicted for breach of the policy was at its highest, 59, in the first half of the 1990s and in the succeeding years 1995-2006, it averaged 39 per annum. In the first 64 years of the Sherman Act, only 21 individuals were incarcerated for price-fixing (Posner 1970: 389-391). This movement can be partly attributed to the change in the Division prosecutions from the secretive contracts of schemes, which included

a greater number of firms and managers in comparison to the typical price-controlling cartel, which has a relatively lower number. The sample shows that for the duration of 1995-2006, the number of cartel executives' indicted rose; for instance in 2005-2007, the yearly figure for charged cartel executives was 22% greater than in 1995-1999. This can be explained, since being charged with a federal offence should have a greater deterrent effect; additionally the actual penalties could have undesirable implications for future employment (Connor, 2008).

The number of individuals fined for criminal price-fixing violations averaged 26.6 per year during 1990–2006 (Table 2.1). Just like the number of firms, the number of individuals fined peaked at 34 per year in 1990-–1994 and has been much lower (averaging 23.5 per year) since then. Furthermore, there is a strong downward trend in the yearly number of fined individuals during 1995–2006. Roughly 61% of all individuals charged with criminal price fixing were subsequently fined. This percentage was highest (79%) in the early 1990s and has dropped down in each subsequent sub-period since then. In 2005–2007, only 41% of those charged were fined. This decline in the occurrence of punishing individuals is explained in part by an increasing share of charges being levelled at foreign residents, many of whom became fugitives (Connor, 2008).

Table 2.1 Annual Averages Cartel Fine for Corporations and Individuals under US DoJ From 1990 to 2007

U.S. DoJ	1990-94	1995-99	2000-04	2005-07
Number of Cartel Cases	72	55	35	25
Corporate sanctions:				
Number corps. Fined	59	27	17	16
Fines/corps. ($mil).	0.5	12.9	10.2	36.8
Avg. corps. fines ($mil/yr)	28	317	174	560
Individual sanctions:				
Person charged	59	36	40	44
Avg. person fined	34.4	27.8	33.6	18
Total fine ($ mil.)	1.62	4.39	3.4	7.75
Fines/person	47	135	150	475
No. imprisoned	14.6	11.4	16.6	23.7

Source: Connor, 2008

The Workload Statistics developed by the Antitrust Division state that the percentage of offenders confined behind bars for the period of 1990–2006 has averaged 37% and has consequently grown in every sub-period: 25% in 1990–1994, 31% in 1995–1999, 46% in

2000–2004, and 54% in 2005–2007. This pattern shows progress regarding cartel deterrence since the figures demonstrate that this proportion jumped from 37% in the 1990s to 52% in 2000–2004, and hit a peak of 74% during 2005–2007 (Hammond 2007).

Denvil (2011) examines the increase of individual sensation by DoJ. His research involved individuals who were sentenced to prison or fined for their acts in cartel cases which took place during the period between 1990 and 2008. In his research, 152 were the known individuals who suffered from such penalties and 151 were those who held prominent positions during the time of the cartel. These individuals are shown in Table 2.2 below (Connor and Lande, 2011).

Table 2.2: Breakdown of Individual Defendants Involved in Cartel Cases by Position in the Firm (from 1990 to 2008)

Position	Number of individual
Heads of the firm	40
Corporate position	24
Mid-level employees	77
Co-owner	3
Stamp dealers	3
Consultants	4
Total	151

Source: Connor and Lande, 2011

Another study carried out by Gallo *et al.* (2000) provides results in relation to sanctions forced in antitrust cases. Table 2.3 reports the number of firms and individuals fined and the average real fine per firm and per individual for completed cases initiated in each year since 1990. The study shows 200 firms and 150 individuals were fined during 1990–1997. The real fines were $8367.47 per firm and $358.93 per individual. Table 2.3 also indicates the number of individuals jailed, the total duration of term served, and the average term served per case and per individual. From 1990 to 1997, 41 individuals have been imprisoned for breaching the antitrust laws. The total number of months served is 294 or 7.49 per case and 6.30 per individual (Gallo *et al.*, 2000). Original study examines the period from 1955 to 1997; however, for the purpose of this study, the focus is only on the period from 1990 onward.

Table 2.3: DoJ Cartel Cases Firm and Individual Fines From 1990-1997

Year	Number of firm fined	Avg. Fine/firm	Number of Individual fined	Avg. Fine/ individual	Number of individual imprisoned	Aggregate length of prison terms served (months)	Avg. prison term/ case (months)	Avg. prison term/individual (months
1990	35	319.583	11	61.143	13	99	9	7.62
1991	50	324.521	26	50.085	15	108	9.82	7.2
1992	32	522.55	12	35.932	4	34	8.5	8.5
1993	24	642.361	16	29.877	3	17	5.67	5.67
1994	13	1424.373	7	60.517	2	7	3.5	3.5
1995	19	1345.821	72	67.84	1	3	3	3
1996	27	3788.262	6	53.537	3	26	13	8.67
1997	0	0	0	0	0	0	0	0

Source: Gallo et al. (2000: Table XIX, XX)

Additionally, Gallo *et al.* (2000) shows that during 1955-1997, an average of the entire price fixing cases had 81% firms as defendants; and 10% as individual defendants. An exciting result is that 60% of the individuals found guilty during 1955-1997 were directors, proprietor, or other executives. Knowing the large size of most corporate cartel affiliates, their executives are likely to be reasonably wealthy persons, the majority with compensation in the $500,000 to $1,000,000 range. Gallo *et al.* (2000) also illustrate that the percentage of international cases prosecuted generally ranged from 2% to 5% in 1955-1979, which fell to 0.2% in 1980-1994, and then increased to 12% in 1995-1997.

2.7.2 The European Approach (European Commission)

Cartel decisions have always been an important part of European competition law enforcement. EU Competition law started in the European Coal and Steel Community (ECSC) agreement amongst France, Belgium, Italy, Luxembourg, Netherlands and Germany, in 1951 after the Second World War. The agreement intended to prevent Germany from re-establishing dominance in the production of coal and steel as it was felt that this dominance had contributed to the outbreak of the war. Article 65 and later Art 66 of the agreement prohibited cartel and the abuse of a central position by firms (Papadopoulos and Anestis, 2010).

In 1957, the real history of competition law and policy in Europe began; the policy was included in the Treaty of Rome, which was also known as EC Treaty. The Treaty of Rome started the enactment of competition law amongst the primary goals for the EEC (European

Economic Community) throughout *"Organization of a system insuring that market competition is not altered".*

The Treaty of Rome, which was signed in 1957, contained Articles 81 and 82 in which antitrust provisions were highlighted. The treaty empowered the Commission to implement the regulations passed by the council within the first three years. Article 81 enabled the European Commission to act according to the principle empowering it to intervene in any wrongdoings by those in authority, who interfered with fair competition and trading practices (Buch-Hansen, 2008).

In Article 81(3):

> *"EC- prohibits agreements and concerted practices which prevent, restrict or distort competition, insofar as they may affect trade between Member States, unless justified by improvements in production or distribution in accordance with Article 81(3) ".*

Regulation 17/62 was introduced in a pre *Van Gend en Loos* period in EC legitimate development, when the supremacy of the EC law was still not completely established. To prevent various interpretations of EC Competition Law, which might differ from a national court to another, the Commission has been made to anticipate the role of central enforcement authority.

Regulation 17/62 Article 101(1) states:

> *"All agreements between undertakings, decisions by associations of undertakings and concerted practices which may affect trade between member states and which have as their object or effect the prevention, restriction or distortion of competition within the common market."*

However, after the Regulation 17/62 which was passed in February 1962, the desire to enforce antitrust regulations was boosted, and it enabled the Commission to take actions like breaking up price cartel and punishing some other anti-competitive acts, which demonstrated the Commission's success and was appreciated by the competitor firms (European Commission, 2009). This regulation had given the Commission a relatively stronger position with the authority of investigating firms' acts, making decisions and providing exemptions to

agreements. It led to the transformation of the Directorate General (DG) into a union wide antitrust agency (McGowan and Wilks, 1995; Wilks, 2005; Lehmkuhl, 2008). In that period, any group of firms was liable to get approval before finalising an agreement between them, and they had to get that approval from Directorate General IV which is now known as the Directorate General Competition (DGC). In fact, Regulation 17/1962 had empowered the European Commission in taking decisions regarding the conformity of cartel with the Rome Treaties. There could be no agreements between the firms unless they were authorised by the European Commission. This outcome reflects the success of the Commission and the working mechanism of the Competition Policy in the Treaty of Rome.

The Commission also shows its authority in altering the structures of practices carried out by corporations, in particular the ones that are opposing to EU competition law. This authority was widely used by the Commission especially in the 1990s and in those cases where it was observed that acts were going against the preferences set by the member states. However, the Commission introduced the term "*modernization Regulation*" which currently employed in EC law circles to refer to changes in the enforcement of Art 81 and 82 of the EC Treaty and in particular Regulation 17/62. A reform which came into effect on May 1/2004 (Council Regulation 1/2003) displayed the demands of the member states for increased powers for national competition authorities which may be seen in the authoritative structure of these member states. The fundamental method of the new regulatory structure is that the Commission and National Competition Authorities (NCAs) now share responsibility for public enforcement of Art 81 and 82 of the EC Treaty (European Communities, 2004).

EU Council Regulation 1/2003 puts the National Competition Authorities (NCAs) and Member State national courts in the centre of the enforcement of Arts (101 and 102). Decentralised enforcement has been the usual way for other EC rules; Regulation 1/2003 finally extended this to Competition Law as well (McGowan, 2005; Budzinski and Christiansen 2005). The Commission still held an important position in the enforcement system, since the co-ordinating induce in the newly created European Competition Network (ECN). This Network, made up of the national bodies plus the Commission, manages the flow of information between NCAs and maintains the coherence and integrity of the system. During this time, Competition Commissioner Mario Monti hailed this regulation as one that will *modernise* the enforcement of Arts 101 and 102. Since May 2004, all NCAs and national

courts are empowered to completely employ the Competition terms of the EC Treaty. In its 2005 survey, the OECD lauded the *modernisation effort* as promising, and mentioned that decentralisation aids to redirect sources so the DG Competition could focus on complicated investigations.

- **Firm sanctions**

Within the EU competition law, fines only imposed on firms involved in anti-cartel acts, though there are some national laws in some states of Europe which impose fines on the managers of those firms. According to Regulation 1/2003, the fines to be imposed will be up to 10% of the firm's total earnings; although the fines are rarely that high, the amount needs to be related to the timescale and type of act committed (Motta, 2007). During January 1998, the European Commission put forth a set of regulations according to which the conditions of imposing fines were made clear and later on, it published new guidelines to reform its fining policy in September 2006 (European Communities, 1998). Corresponding with the new regulations, the Commission will employ a two-step system to set the fine.

- **Individual sanctions**

The EC has no powers to impose fines on individual (OFT, 2009). The attempt to enforce individual sanctions against cartel activities at EU level faced some serious difficulties. The efforts to inflict individual legislation against cartelist by the commission, even if it presented Member State support, seemed to be met by systematic resistance, especially following the Judgment of the German Constitutional Court. It is important to note, however, that the use of individual criminal penalties for such violation at a national level (Germany, Netherlands, etc.) was explicitly authorised by the Council of Ministers (Morgan, 2010).

- **Amnesty Programme**

In 1996, a leniency policy was established in Europe in the hope of reducing acts involving violation of cartel law by firms, but this did not give the European Commission the expected results. According to this leniency policy, a firm could have a 75% to 100% reduction in fines by the Commission if the firm reported its acts to the commission before the start of the investigation and was not found to be leading other firms in committing the same crime. They were able to get a 50% to 75% reduction if the firm cooperated with the Commission during the investigation process. In both the cases, the firm needed to be the first one to let the

investigation begin and inform the Commission of its acts. If these two conditions could not be met even then the firm could have a reduction of between 10% and 50% if it cooperated with the Commission in carrying out the investigation. The flaws which led to the failure of this policy included the lack of transparency in the imposition of fines over the firms by the European Commission as the firms did not know the amount which they were to be charged until the final decision was published. The fine reduction policy was not as clear as that practised in the US. Another factor was the absence of immunity provided to firms after the beginning of the investigation process.

However, in February 2002, amendments were made in the structure of the policy making the level of fine clear to the firms even during the investigation process and the provision of immunity to the cooperating firms was also made automatic just like in the US (Official Journal of the European Communities, 2002). In fact, every firm was provided with immunity from fines if it helped supply evidence to the investigators during the inspection phase provided that these firms were not the instigators of the cartel. Though the policy was reviewed again in 2006 no further prominent changes were made (Motta, 2007).

The European Commission proposed a public consultation in October 2007 which provided individuals involved in acts of cartel space to acknowledge their law violating acts and made the procedure of investigation faster. This practice allowed the Commission to deal with the maximum number of cases in a short time. The proposal is consistent with the revised version of the leniency notice and the revised guidelines of imposing fines. These acts were not in accordance with US policies which for the past 20 years have dealt with almost 90% of cartel cases with plea agreements. However, the practices of the Commission were not in favour of dealing with cartel cases through face to face talks with the firms. Leniency is only provided in cases of cooperation from the firms going through the investigation phase (GCR, 2013). To reach the decisions earlier, the Commission spends the same amount of time as the US Department of Justice Antitrust Division spends on cartel cases before reaching any conclusion.

- **Settlement**

A policy laid out in the Commission notice on the Conduct of Settlement Procedures in 2008 states that firms that acknowledge their liability can be rewarded with lower fines for reducing the burden on the EC's resources. The EC retains full discretion about which firms can benefit from settlement and the terms of the settlement (OFT, 2009).

- **Private damages**

The European Union, private enforcement actions are rare and take smaller part than public enforcement in the fight against antitrust behaviour. Several complication delay actions for damages in member state national courts, including a limited access to evidence, the unavailability of class actions and the potential that the applicant may have to pay the defendants' costs if the applicant loses the case. To concentrate on these complications and the large range of damages actions amongst the member states, the European Commission lately published a green paper on Damages Actions for Breach of the EC Antitrust Rules. The green paper looked at those aspects of EU litigation practice that have led to a pronounced underdevelopment of private damages actions in the EU. Since its publication in December 2005, the green paper has sparked significant debate within the international antitrust community about the role of private enforcement of EC Treaty competition law and about damages actions in particular. The general expectation is that private damages actions will emerge in the European Union (SEC, 2005).

- **Literature on the penalty regime of European Commission**

In early decades, the fines that were given for infringements by the European enforcement usually concerned cases that resulted from a Commission's own initiative or a complaint. However, since 1970 the Commission has produced roughly 5 cartel infringement decisions per year on average. In recent years, Europe has seen a lot of cartel activity revealed by the enforcement efforts. The Commission followed the U.S in the mid-1990s in the enforcement prohibition of concerted practices with the object or effect to prevent, restrict or distort competition in the common market. During the terms of Commissioners van Miert and Monti, the EC undertook a major transformation of the competition rules. It stepped up its cartel enforcement with a special cartel task force in DG Competition (Van Miert, 1998).

The fines imposed by the European Commission between 1990 and 2009 had constantly increased and are shown in the table displayed below. Prior to 1990, the EC had levied fines of about 60 million on 23 petrochemical producers for their fixing prices in the plastics industry (European Commission, 1988). Table 2.4 below displays the fine imposed on firms' shows that since 2006, the EC has fined cartel over €1 billion annually, with €3 billion in 2007, indeed in the first quarter of 2007 over €1.6 billion was imposed as the result of only two such law violating acts. In December 2008, the EC imposed fines of over €1.3 billion on four car glass manufacturers for their cartel act, which was the largest fine ever imposed by the EC (European Commission, 2008).

Table 2.4: The Estimated Cartel Cases Decided by the European Commission from 1990 to 2009

Year	Corporate fine €/m	Cases decided	Number of firms fined
1990 – 1994	344.282.550	11	138
1995 – 1999	292.838.000	10	56
2000 – 2004	3.697.516.100	30	24
2005 – 2009	9.643.606.100	33	112
Total	**13.978.242.750**	**85**	**330**

Source: European Commission, 2008

A research conduct by Veljanovski (2007) examines the EC law fines on price fixing. Table 2.5 below shows the amounts charged by the EC from firms involved in cartel conduct, the duration of such conduct, the gains of firms and consumer loss. The table shows that the highest fine imposed by the Commission was on Plasterboard case. The maximum harm on consumer was from the Vitamin B2 case by 186%.

Table 2.5: Estimates of Consumer Losses and Optimal Fines

Cartel	Years	Fine € m	Sale € m	Consumer Loss € m	Harm
Lysine	4	110	164	181	61%
Vitamin A	9	132	150	413	32%
Vitamin E	9	203	250	688	29%
Vitamin B2	4	70	34	38	186%
Vitamin B5	8	106	34	96	110%
Vitamin C	5	114	120	168	68%
Vitamin D3	4	41	20	22	184%
Beta Carotene	6	64	76	131	49%
Carotenoids	6	62	50	86	72%
Carbonless Paper	4	314	1079	1198	26%
Graphite Electrodes	6	219	420	722	30%
Methylglucamine	9	3	3	9	33%
Citric Acid	4	135	320	353	38%
Plasterboard	7	478	1210	2478	19%
Methionine	13	127	260	1122	11%
Speciality Graphite	5	42	84	118	36%
Extruded Speciality Graphite	4	9	42	46	19%
Food Flour Enhancers	9	21	12	33	62%
Carbon &Graphite Products	10	101	290	905	11%
Organic Peroxides	25	70	250	2649	3%
Choline Chloride	6	66	122	210	32%
Copper Plumbing Tubes	13	222	1151	4967	4%
MCCA Chemicals	15	217	125	651	33%
Rubber Chemicals	5	76	200	282	27%

* Note: annual sale in the preceding year as reported by the European Commission.
Source: Veljanovski, 2011

Another study by Motta (2007) examines the cartel deterrence and fines in the EU. Table 2.6 below shows the number of firms that have been fined for violation of cartel laws since 1990. The figure clearly shows that there is a large increase in the number of firms committing cartel. The figures highlight the increases since the 1990s, specifically those after the 1998 introduction of new guidelines in the imposition of fines. The given statistical data illustrate the firms involved in cartel cases and the sort of fines levied on them by the European Commission. The average number of cartel cases revealed by the Commission from 1990 to 1999 is 2.9 cases; at the same time, the average number of cartel cases revealed by the Commission from 2000 to 2007 is 5.25 cartel cases.

Table 2.6: Cartel Decisions Made by European Commission From 1990 to 2007

year	Number of cases	Number of firms	Fine /€ m
1990	2	4	18
1991	0	0	0
1992	4	48	44.76
1993	0	0	0
1994	15	86	399.106
1995	1	2	11.8
1996	1	5	0.65
1997	0	0	0
1998	5	41	451.89
1999	1	8	99
2000	1	5	112.9
2001	9	59	1780.29
2002	9	47	944.87
2003	5	28	404.78
2004	5	33	354.2
2005	5	41	682.32
2006	5	56	1833.11
2007	3	19	2014.81

Source: **Motta, 2007**

2.7.3 The UK approach (Competition Commission/ Office of Fair Trading)

The UK's approach against cartel has altered significantly in the last decade. Prior to the Competition Act 1998, the policy was based on the 1976 Restrictive Trade Practices Act. This restrictive practice regime emphasised the form of the agreement (Morgan, 2009). UK law considered the formal terms of agreements and sought to confirm whether they were phrased in restrictive form against competition law. The 1976 Act could have been applied with complete thoroughness but have little influence on competition (Morgan, 2009).

Though the UK government felt the need for reforms, action was not taken instantly although in 1978 and 1979; two Green Papers were issued on the subject. The Competition Act 1980 did not change the monopolistic controls or restrictive practices but instead added a third component to the British antitrust policy. After a decade of struggle, the Conservative Government issued another Green Paper (DTI, 1988). This document acknowledged the need for fundamental changes in the law of restrictive practices and suggested the harmonisation of the UK control of anti-competitive agreements with EC competition laws. Hence, the

White Paper released the next year agreed to the required changes and also offered an abstract of the weaknesses of the existing act (DTI, 1989). The UK government accepted the fact that *'our existing system is rigid and time-consuming, repeatedly dealing with cases that are ineffective and not thoroughly associated with anti-competitive agreements*' (DTI, 1989). Along with other recommendations, it suggested dissolving the registration system under the 1976 Act and replacing it with a clause 81(1) EC pattern general injunction, to establish a strong competition authority to acquire the power of the Director General (DG) and to apply a system of individual and block exclusion based on Article 81 (3) EC. All these recommendations were initially expected to be implemented by 1991 (DTI, 1989).

Later, in 1992, another Green Paper outlined an alternative sequence of possible reforms (DTI, 1992). In this paper, the central point was to accept the reform on the abuse of monopoly. Therefore, choices considered were a general ban on abuse of influential position considering Article 82 EC, following the dual system which maintained the Fair Trading Act 1973; and avoiding differences and inconsistency in interpretation to make the existing structure stronger. The Green Paper also supported the government intention to establish new authorities as soon as possible, but little consideration was given to these proposals. Rather, the Deregulation and Contracting Out Act 1994 limited the authority of the United Kingdom law regardless of aligning it with the Treaty of Rome (Pratt, 1994).

The Competition Act 1998 became operational in 2000 based on Article 81 (OFT, 1999). This Act was allied to national competition law and EC law as closely as possible (Articles 81 and 82 EC) for minimising the regulatory liability on firms. To achieve this goal, the government had to add two chapters - Chapter I, restrictions on anticompetitive agreements and Chapter II, abuse of a dominant position. Firms that agreed or plotted to fix prices, limiting production, rigging bids or share markets would be breaching section 2(1) of the Competition Act 1998 covered in Chapter I and the prohibition affecting the trade through attitude and behaviour between Member States, Article 81(1) of the EC treaty.

- **Firm sanctions**

For the first time, the Competition Act 1998 introduced fines for firms found acting against fair competition. Later, the amount of maximum fine was fixed at 10% of a firm's per annum worldwide turnover, as at EC level (OFT, 2004a). This corporate penalty alone was not

enough to discourage firms from forming a league of their own to control the market. Moreover, suggestions for individual criminal sanctions were mentioned in the joint Treasury/Department of Trade and Industry report on productivity issued in June 2001 (DTI, 2001).

- **Individual sanctions**

The Enterprise Act of 2002 introduced the cartel crime as a criminal offence for individuals *dishonestly* participating in cartel agreements. This criminal offence operates together with the Competition Act 1998 regime, which provides civil sanctions for any 'undertaking' that breach the law (OFT, 2003a). Anyone involved in criminal cartel wrongdoing under the Enterprise Act 2002 - such as price-fixing - might face the prospect of going to prison for a period of five years, and/or an unspecified level of fines.

Previously, the penalty was only a regulatory slap on the wrist, but after the Competition Act 1998, there was a significant prescription for such unhealthy competition in the UK market. Extreme cartel violations are directed to the Community level by the European Commission Directorate General Competition, when Article 81 EC is breached. There is a legislative 10% limit of an enterprise's worldwide turnover, which is intended to protect enterprises from the unfavourable effects of huge fines; this is the only sanction that is available as an administrative fine for corporations under Regulation 1/2003 (preceded by Regulation 17/1962). At the time the Enterprise Act 2002 was introduced, it made remarkable changes to UK's competition law. The act was executed during 2003 with several important clauses coming into effect from 20 June 2003. The White Paper that was published before the introduction of the Enterprise Bill argued that the probability of getting detected might avert the need for agreeing what a satisfactory level of fines to discourage cartel breaches would be (DTI, 2001). The criminal offence ensuring to compensate for this drawback in anticipation is aligned with cartel application on both the Community and UK levels (Sealy and Milman, 2012).

The Enterprise Act introduced a new clause that had the power to execute *disqualification* orders on directors of enterprises. Under the Competition Disqualification Order, the court can disqualify an individual from being a director of a firm with violations of Competition Act (Articles 81, and 82 of the EC Treaty and Chapters I and II prohibitions). This

disqualification order can prevent a person from being a director for a period of 15 years. The first sentences resulting from guilty pleas after a US plea bargain agreement were handed down five years after the offence came into force in the UK (OFT Press Release, 2008). Clearly elected consumer bodies will be allowed to apply for rights to address damage claims on behalf of a named individual consumer. An extra restriction imposed by the UK government is an individual sanction, which can include an unlimited fine on conviction for the cartel offence or imprisonment of up to five years. Moreover, the Commission initiated actions for damages for anti-competitive behaviour, looking after details and proceedings in the normal courts for damages faced as a result of a violation that may be taken up in the Competition Appeals Tribunal.

- **Amnesty programme**

The OFT leniency programmes are based on the experience of the US leniency programmes, and all their clauses are related to the US DOJ corporate amnesty policy. On the contrary to the EU, the OFT implemented the "leniency policy plus" alike to the one in the US, which gives the opportunity to corporations that is under investigation in one case to reveal information and evidence about another case. By doing this, they will obtain an additional reduction in fines (Morgan, 2010). The US experience proved that in order for the leniency policies to work well with both individual and corporate levels, there is a need to be predictable and clear (Barker, 2009)

The leniency programme was considered by UK Office of Fair Trading for the establishment of suitable punishments under the new Competition Act. A modified version of this recommended guidance was approved in 2000. Individuals who provide information have immunity from prosecution and can save themselves from getting disqualified from being a director. Recently, the information from whistle-blowers became the way in which cartel behaviour was discovered. Moreover, the evidence collected was used in the investigation by OFT (Grout and Sonderegger, 2005).

- **Settlement**

Although OFT programmes have not mentioned the conditions of all the settlements that have been agreed upon till now, the OFT may utilise any settlement discount given for

cooperation in its clemency programme. This programme took an important role in detecting cartel and helped in investigating cases effectively (Aubert *et al.*, 2004).

- **Private damages**

A private action is a fundamental principle of the Community law in Europe (Art 81 and 82). The White paper introduced a number of provisions that aimed at facilitating private actions. However, private actions have not played the part being predicted.

- **Literature on the penalty regime of Competition Commission and Office of Fair Trading**

In 2008, David Brammer, Peter Whittle and Bryan Allison were sent to jail for 30 months and three years for participating in a worldwide cartel in the supply of flexible *Marine Hoses* case. After attending a cartel meeting, the three individuals were arrested by the US antitrust authorities in 2007. The DoJ caught and imprisoned a BA executive Keith Packer, for an equivalent crime relating to air cargo fuel surcharges in October 2008 (DoJ Press Release, 2008). However, the first real test of the new anti-cartel laws at a tribunal was brought by the Serious Fraud Office (Prosecutions of the cartel offence in England and Wales, and in Northern Ireland are generally undertaken by the SFO. Prosecutions in Scotland are brought by the Lord Advocate). Those found guilty had accepted the charges levelled against them and were found guilty in the US under a plea bargain. These individuals will also appear in court to make sure that they were not deported to the US. The US Department of Justice Antitrust Division (DoJ) permitted them to return to the UK on the condition that they will plead guilty to the UK cartel offence and will be sent to the US if their UK punishments were less than those accepted under the plea agreement. The other conviction of four British Airways Executives involved in the price-fixing of *fuel surcharges* cases will appear again in court to argue against deportation to the US.

Table 2.7 below illustrates the value of fines imposed by the OFT from 2001 to 2006. In 2003, following successful prosecutions regarding price-fixing of 'Hasbro Toys' and 'Replica Football Kits', and the 'Genzyme Limited' exclusionary practice case, the OFT collected approximately £48 million (€54.59m) in antitrust fines, which adds up to more than a half of the total amounts collected as fines from 2001 to 2006. The OFT levied £63.1 million (€71.6 million) in antitrust fines as a result of 19 cases involving 77 firms.

Table 2.7: Fines Imposed by the OFT From 2001 to 2006

Year	Fines imposed in £/m
2001	£4,538
2002	£5,187
2003	£48,047
2004	£2,039
2005	£697
2006	£2,624

Source: **OFT, 2009**

Table (2.8) below provides a comparison between the three jurisdictions discussed.

Table 2.8: Legal Enforcement against Cartel: Comparison Between U.S, EU and UK

Jurisdiction	Max Individual fine	Max prison term	Other penalties	Corporate Fine	Leniency	Settlement	Private damages actions
(EU)/EC (Civil)	Not applicable	Not applicable	Not applicable	10% of total worldwide turnover.	Full 1, 2	Policy laid out in the Commission Notice on the Conduct of Settlement Procedures (2008). Firms that acknowledge their liability can be rewarded with lower fines for reducing the burden on the EC's resources. The EC retains full discretion about which firms can benefit from settlement and the terms of the settlement.	No
(UK)/CC/OFT (Criminal/Civil)	Criminal: £5,000 (€5,687) (magistrates court), unlimited (crown court)	5 years	Competition Disqualification Orders	10% of total worldwide turnover	Full 2	No formal policy. Lower fines have been imposed on firms that do not contest OFT findings and do not appeal a decision (for example, Independent Schools).	Yes
(US)/ DoJ (Criminal/Civil)	Criminal: $1 million (€779,277) or twice the gain/harm	10 years	Not applicable	• USD $ 100 million (~ €76 million) under the Sherman Act, or • An alternative sentencing statute allows for fines up to twice the gain derived from the criminal conduct or twice the loss suffered by the victims.	Full 1	Negotiated settlements are possible at any stage of the investigation. More than 90% of convictions in antitrust cases are a result of 'plea-bargaining'.	Yes

Sources: Gallo et al. (2000), and OFT (2008)

Notes: immunity is available for both firms and individuals. 1) Not available if the applicant was the ringleader in the infringement. 2) Not available if the applicant coerced other parties to participate in the infringement.

2.8 Chapter Summary

This chapter has presented the definition and forms of cartel; the theoretical framework where the oligopoly theory and the game theory for cartel existence are explained; the direct and indirect effects of cartel imposition; and the anti-cartel enforcement policies by the United States (DoJ), Europe (European Commission), and the UK (Competition Commission/Office of Fair Trading).

This chapter tackles the purpose of cartel formation in today's competitive environment and how cartel players undertake their roles through anti-trust enforcement. The participation constraint requirement and the incentive compatibility constraint aid in successful cartel operation. Market characteristics contributing to cartel stability include the presence of entry barriers, the number of firms, the quality differences/product differentiation, seller concentration, capacity constraint and excess capacity, buyer power, demand elasticity, and static or declining demand. The essence of cartel formation is the establishment of agreements amongst firms on fixing or raising prices to undermine the competition, carve the market, or allocate market shares. Cartel imposition directly affects customers, suppliers, non-participating competitors, and the final consumers. These direct effects are in the forms of actual loss (overcharge), profit loss, and interest (opportunity cost). Indirect effects, on the other hand, include X-inefficiency and long-term structural effects on the market. Individual and firm accountability is discussed to show who is accountable for cartel formation. Whether the firm decides to collude or not is influenced by the presence or absence of antitrust policy and how such policy is enforced. The US approach, European approach, and UK approach to jurisdiction provide an elaboration of fine sanctions, individual sanctions, amnesty programme, settlement, and private damages to deal with cartel commission.

The next chapter shall examine the concept of corporate governance, its link to market competition and cartel formation. It also discusses theoretical background and literature review, thereby offering clarity to the subject matter.

Chapter Three

Literature Review and Hypothesis Development

3.1 Introduction

This chapter looks first at the concept of corporate governance and the roles of the CEO and board of directors in corporate governance. In addition, it discusses the influences of corporate governance on market competition, and cartel formation. This followed by a discussion from the literature on the relationship between cartel formation and CEOs as well as the impact of cartel formation on shareholders.

A discussion of agency theory shall be presented in tackling the concept of corporate governance and cartel formation. It will then identify the independent variables and justifies its utilisation in this research as proxies for corporate governance attributes. Finally, an overview of literature on corporate governance will be used to justify the inclusion of each independent variable and provide an understanding as to why these attributes may be associated with the incidence of cartel formation.

The independent variables reflecting corporate governance attributes are grouped in four different types which consist of board of directors' characteristics, ownership structure, CEO characteristics and CEO compensation packages. Once support for the component of each variable is provided, a number of individual propositions will be posed. The results of testing the propositions will be furnished in Chapter Five.

3.2 The Concept of Corporate Governance

The development of the concept of corporate governance started taking place in developed market economies over the past decades where the manner of managing the firm was said to determine the economy and the firm's efficiency and competitiveness. However, corporate governance is questionably more significant in transition economies taking on marketisation and reforms in wholesale property rights (Lin, 2001). These economies feature a kind of privatisation with no associated efforts to tackle issues on corporate governance, which led to ownership patterns and insider control that are unfavourable to restructuring and output recovery. Today, there is wide

recognition in the corporate governance development as an essential trajectory for an efficient market system to successfully go through transition (Lin, 2001).

Corporate governance has been defined as a framework provided for the management of resources in an efficient manner and for the application of these resources in society. These activities are to clearly exhibit the interests of the individuals, corporations, and society as a whole. Cadbury (1992) provides this concept of corporate governance in his speech at the Global Corporate Governance Forum. The concept focuses on firms and their shareholders, as well as the firms' accountability to several groups of people, or 'stakeholders' (Solomon, 2010).

Charreaux and Desbrieres (2001) believe that corporate governance is anything that governs the actions and activities of the management and the reason why such actions are carried out in the first place. Corporate governance also provides an assurance to the investors of the organisation that they would be provided a return on their investments (Shleifer and Vishny, 1997) Persons (2006) states that if an organisation takes on negative actions, it is possible that it may not be able to generate high returns after a certain period.

It must be noted that any negative activity carried out by the management has the ability to reduce shareholder wealth. This is why the concept of corporate governance is introduced to protect the wealth and well-being of the shareholders in the long run. These shareholders are the ones who actually provide the capital to run the organisation and it would be an extensive task to individually monitor all activities. For this reason, a corporate governance structure is presented which has the ability to analyse that all fiduciary duties have been carried out accordingly.

A study was conducted by Hermanson *et al.,* (2006) in which ten fundamental conclusions is presented relating to the concept of corporate governance. The basic concept behind all these conclusions is that in order to gain the confidence of the investors in the financial markets, it is essential to carry out corporate governance practices. Hence, all the different kinds of literature present the same aspects of corporate governance. They all believe that corporate governance is a framework or structure being followed by the management to keep them in control. These activities are monitored at all times so that they may be stopped before any kind of fraudulent action could take place, which might ruin the reputations of the organisation (Solomon, 2007).

To help align the diverse interests of directors/managers and shareholders, market competition plays as an external mechanism to discipline management as well as the internal mechanisms of corporate control can be employed (Walsh and Seward, 1990). Next section briefly discusses corporate governance in relation to board of director, CEO and ownership structure.

3.2.1The Board of Directors Roles in Corporate Governance

The board of directors is considered the most important element in the internal framework of corporate governance (Fama, 1980; Fama and Jensen, 1983). The board's composition serves as the basis for establishing the board with effective management monitoring. The agency theory views that an independent board is a vigilant element of agency problem since it involves a considerable number of non-executive directors tasked to monitor the performance and behaviour of management (Johnson *et al.*, 1996; Bainbridge, 1993).

The principal-agent theory of financial economics leads to the dominant views on the role and significance of corporate boards of directors (Jensen and Meckling, 1976; Daily *et al*., 2003; Lynall *et al*., 2003). The seminal work of Berle and Mean (1932) was the basis of the principle-agent theory and underlined the newly formed distinctions between the firm ownership and operational control and the benefits that were achieved through having specialized managerial staff that had relevant expertise and knowledge (Fama and Jensen, 1983).

However, the dispersed share ownership and the development of qualified management that was specialized would lead to a possibility of conflicting interests, as Berle and Means (1932) pointed out. According to the principal-agent theory, the 'principals' who are the owners of the firm i.e. the shareholders are usually distinct from the 'agents' who are the managers of the firm, and this distinction leads to the agents having an advantage over the principals with respect to availability of information (Jensen and Meckling, 1976).

The agency theory assumes that the managers keep their own interests in mind when making decisions and these interests may not necessarily be the same as that of the principals. The shareholders benefits are of secondary importance to self-serving managers looking to maximize their personal utility (Jensen and Meckling, 1976). In this regard, the 'model of man' that the principal agent model represents believes that the management acts in "a homo economicus…individualistic, self-serving and opportunistic manner" (Davis *et al*., 1997). Managerial

decisions that are not satisfactory for the principals come about when the utility of the manager is derived from rewards that are financial or status based instead of inner satisfaction regarding the firm's success. Management may get involved in activities that seek to build an empire, reduce risk by diversifying the firm and corporate philanthropy activities that look for prestige, activities that do not necessarily increase the shareholder value (Ong and Lee, 2001; Denis and McConnell, 2003).

Various functions are intended to be carried out by the board of directors, when considered from the perspective of agency theory, to ensure that the costs pertinent to separation of ownership and control are minimized (Daily *et al.*, 2003; Denis and McConnell, 2003). This model specifically implies the key role of board of directors to employ an effective method of supervising and reporting so that the degree of unequal distribution of information between the principals and agents is reduced. To make sure that this supervision function is carried out effectively, it is vital that the board of directors is independent of operational management to some degree at the least (Davis *et al*., 1997). It is due to this viewpoint that many discussions are taking place with respect to the significance of having non-executive directors who may be from outside the organization.

The chairman of the board also needs to be separated from the operational activities so that a board that is independent enough to be able to meet its supervisory responsibilities effectively is formed (Davis *et al*., 1997; Boyd, 1995; Green, 2004). Board of directors that are from outside the organization put forward opinions that are independent of executive management. They consider the maximum benefits for the shareholder when evaluating the strategy of the firm and are expected to study the proposals of the executive management with objective reasoning. This creates a pressure on the executive management to avoid taking actions based on personal motives seeking to maximize their utility.

The issue of agency problem can also be resolved through the employment of external board of directors who also help to integrate the interests of the shareholders and managers which eventually leads to a better financial performance (Daily *et al.*., 2003; Peng, 2004). The independence of the board is also improved when the roles of the CEO and Chairman of the board are separated which leads to an independent evaluation of the executive manager's suggestions and also lessens the power held by the CEO. According to the agency view, this would lead to an improved financial performance through more firm decision making at the board level (Boyd, 1995; Beatty and Zajac, 1994; Finkelstein and D'Aveni, 1994).

The incentives of the agents need to be parallel to those of the principals so that the former are inclined to proceed according to the interests of the latter. This is the second vital responsibility of the board directors. The right remuneration policies need to be formed and executed so that the incentives of the managers and owners become parallel (Daily *et al*., 2003; Conyon, 2006). Schemes like rewarding senior managers with shares or giving them the option to buy shares at subsidized prices (Jensen and Meckling, 1976), or compensating the executives and awarding bonuses by ascertaining the levels of returns that the shareholders receive (Buck *et al*., 2003) need to be implemented as part of systems that are formed to bring the interests of principals and managers in line with each other.

Resource dependence theory is the third important perspective on the function of board of directors and it presents the view that the corporate board of directors is an important aspect of the firms' attempts to exercise control over their external environment (Muth and Donaldson, 1998).

The impacts of economics, science, politics and sociology are conceptualized into a multifaceted approach called the institutional theory, which is the fourth theory that needs to be implemented in corporate boards. Studies on corporate boards manifest a particular aspect of institutional theory the most which is the idea of isomorphism and legitimacy (Parker *et al*., 2007; Peng, 2004; Li and Harrison, 2008; Young *et al*., 2000; Myllys, 1999; Chizema, 2008).

The conflicting interests of the ones who make the decisions and the ones who bear the risks is brought into alignment through the board of directors influence to appoint, dismiss and give benefits to senior management teams. Thus, large business organizations consider them to be an integral part of their governance structure as the recent developments in economic theory implies (Williamson, 1983, 1984; Fama and Jensen, 1983a).

The responsibility of managing decisions is handed over to the CEO while the board assumes control of the decisions, which makes it easier for the corporations to take care of the possibility of agency problems. This means that the strategic decisions are initiated and executed through the CEO while the board endorses and monitors those decisions. The primary task of the board is to align the conflicting interests of the shareholder and top management by serving as a system of internal control (Mizruchi, 1983; Walsh and Seward, 1990).

3.2.2 The CEO Roles in Corporate Governance

Because CEOs are the key decision makers in firms; there is interest in the role that CEO play in explaining the difference in corporate decision across firms.

According to Hazarika *et al.* (2012), the imposition of costs on shareholders can be undertaken by CEOs who manage earnings, but an important issue is whether boards take a proactive or reactive action to discipline these managers, and whether they do act only when external consequences have taken place out of manipulation. The authors use a sample of forced and voluntary turnovers within the period of 1992 to 2004 and find a positive relationship between earnings management and the likelihood of forced turnover. A negative relationship is found between a CEO's job tenure and the extent to which earnings are actively managed during his term of office. These results are consistent in tests that take account of the potential changes in CEO turnover and earnings management, as well as external consequences. Firms performing either good or bad can involve the occurrence of the relation between forced turnover and earnings management, as well as the inflating or deflating of reported earnings through accrual work. These results suggest that proactive action is undertaken by at least some boards in disciplining managers with aggressive earnings management prior to costly external consequences caused by such manipulations. This idea is congruent with the notion that internal governance addresses managerial agency problems (Hazarika *et al.*, 2012).

Hazarika and colleagues' study finds usefulness in this research as it contributes to explain the behaviour of the firm in chastising managers that practise earnings management aggressively as well as the CEO's job tenure and their corresponding degree of active management of earnings. This in turn contributes to addressing the hypotheses as it provides enlightenment on these areas, which are essentially tackled in this research.

Only when executives have gained influence on crucial decisions can they impact firm outcomes. It is through the basis of this idea that Adams, and Ferreira (2003) design and test a hypothesis stating that firms with CEOs that have more decision-making power should have performance variability. The focus of the study is directed to the CEO's power over the board and other top executives. The authors find out that more variable stock returns are indicated for firms managed by powerful CEOs and that firm performance generates important consequences as a result of the interaction between organisational variables and the characteristics of executives (Adams *et al.*, 2005). This article is

useful to the topic being investigated as it focuses on the influential role of CEOs on firm performance, and the relationship between powerful CEOs and firm outcomes, which is indicative of corporate governance.

Corporate governance saw its greater importance in the Enron failure and the collapse of high-profile corporations. Debates relating to corporate governance efficiency have emerged along with this, including controversies on director and CEO remunerations, greater stakeholder approach to governance, and the like. This led to debates in current corporate governance, which consider the role and structure of boards from a number of theoretical perspectives. It is worth noting that these theoretical perspectives commonly aim to posit a link between corporate governance and board characteristics. Agency theory involves the alignment of the interests of managers and owners and assumes that an inherent conflict exists between the management and the owners of the firm (Nicholson and Kiel, 2003).

Whilst there are studies support the assertions of both agency theory and stewardship theory, it is found out through a recent meta-analysis that substantive relationships do not exist between firm performance and board composition. In another meta-analysis study, it is concluded that a slight positive relationship exists between the two. Overall, consistent evidence of any significant relationship between them is generally lacking (Nicholson and Kiel, 2003). The study infers that larger firms are characterised by larger and more interlocked boards, increased proportion of external directors, and increased likelihood to separate the chairman and CEO roles. These firms view greater number of directors as necessary in the outsiders' increased proportion and the separated roles of the CEO and the chairman so that the firm may be efficiently monitored and controlled (Nicholson and Kiel, 2003).

Since these firms need to seek greater links with other firms, the corresponding impact would be appointment of more directors and search for more interlocks, which are linked to firm size and board size. It must be noted, however, that no relationship exists between the amount of interlocks and CEO concentration power. Whilst there is evidence in the notion that boards will aim to connect with the external environment, there is no presence of any link between this pursuit and firm performance (Nicholson and Kiel, 2003). This study by Nicholson and Kiel is useful to this research report as it tackles the interplays between several variables of corporate governance, i.e., firm performance, firm

size, CEO concentration power, number of interlocks, etc., which provide evidence to the role of CEOs in corporate governance.

Ferris *et al.* (2003) found in their study that directors nearing retirement age might consider multiple directorships. Age is said to serve as a proxy for the director's experience and the energy needed for the demands of board service. The study found that the regression for the number of directorships vis-à-vis age involves a significant positive co-efficiency. It also suggests that older directors with greater experience of directorships are no longer interested in additional directorships or might pose as less attractive candidates. The average age of directors is also older in boards with multiple directors. In a particular corporation, arbitrary terms are not held by the board as a limitation that may be imposed on directors' service. The board does not also maintain a position that directors must be remunerated annually until upon reaching the mandatory retirement age (Clayman *et al.*, 2012).

3.2.3 Ownership Structure and Corporate Governance

A theoretical model is developed by Desender (2009) purporting to better understand of how ownership structure influences the priorities of the board of directors, and how firm performance is affected by this. Despite the discussions of several researches on the universal link between corporate governance practices and performance outcomes, there is neglect in the firm's specific context, however. Moreover, diverse environments result in disparities in the effectiveness of various government practices.

Desender (2009) posits that the board's priorities are influenced by ownership structure, and that these priorities ascertain the board's optimal composition. In the case of a board that sets priorities on *monitoring*, such board views the importance of directors with concentration power and financial experience. In the case of a board that sets its priorities on the *provision of resources*, such board benefits from directors of diverse characteristics, the CEO's presence on the board, and a larger board size. Greater sensitivity is required in understanding how the board influences firm performance, and such sensitivity must be focused on the impact of corporate governance on the various areas of effectiveness for a range of stakeholders.

The insights that may be derived on the link between board composition and ownership structure can bring about new realisations on the conflicting empirical results of past research that attempted to provide direct association between board composition and ownership structure. In view of perceived benefits from reengineering governance systems, discussions have emerged in terms of the suitability

of executing recommendations for corporate governance characterised by dispersed ownership (Desender, 2009).

Desender (2009) points out that ownership structure is a key dimension to corporate governance and is also largely seen as having been determined by corporate governance characteristics of other countries, such as the nature of state regulation and stock market development. It is found that shareholder structures are fairly varied across countries, where frequency of dispersed ownership is seen in listed firms of US and UK. Moreover, rich economies often have typically concentrated ownership of large firms, whose control is often carried out through pyramidal groups. Albeit large shareholders dominate the control of some large firms in the U.S (e.g. Microsoft and Ford), these firms are however few and have not drawn much attention to the corporate governance debate.

Accordingly, there are two apparent consequences in the differences in ownership structure for corporate governance: (1) dominant shareholders are empowered and incentivised to discipline management, and (2) a new problem can be created by concentrated ownership because of the lack alignment between the interests of controlling shareholders and those of minority shareholders. Whilst maximisation of returns at reasonable risk is the primary concern of shareholders, preferring growth to profits may be the concern of managers. Considering the fact that ownership and control can be potentially separated, the interests of principals and agents must be aligned through various mechanisms. Due to the problems faced by shareholders in their monitoring of the management, a corresponding increase in agency costs had taken place. These problems include the existence of imperfect information experienced by these shareholders in relation to making qualified decisions. Reducing these costs requires designing a range of contractual mechanisms, such as corporate boards, which in turn lead to aligned interest between the management and those of the stockholders. Therefore, taking an agency perspective, the board's main focus is to monitor the actions of management (Desender, 2009).

The board of directors is said to perform two functions: To monitor and provide resources. Agency theory provides the theoretical underpinning of this monitoring function, describing the likely conflicts of interest caused by the separation of control and ownership in organisations. The board's primary function is to monitor the actions of managers (agents) so that the interests of owners (principals) may be protected (Eisenhardt, 1989; Jensen and Meckling, 1976 cited in Desender, 2009). The board's monitoring task is important since potential costs are earned as management carries out its own interests to the detriment of shareholders' interests. Agency costs, which are

intrinsic in the separation of control and ownership, are reduced through the monitoring stance of board of directors (Fama, 1980; Zahra and Pearce, 1989 cited in Desender, 2009).

Researchers argue that boards comprising mainly insiders or even outsiders who do not enjoy independence from the firm or the current management are less incentivised to monitor management due to their dependence on the CEO or the organisation. Boards subject to outside, non-affiliated directors are perceived to monitor better because of lack of this deterrent to monitor.

According to Jensen and Meckling (1976, cited in Laiho, 2011), the ownership structure is important not only in terms of how much the firm insiders own, but also in terms of the extent of concentration held by the holdings of the outside shareholders. It is argued that large shareholders are better able to monitor the management compared to small shareholders. This is because large shareholders internalise larger aspects of the monitoring costs and possess sufficient voting power in corporate decisions. Small shareholders, on the other hand, are only able to influence corporate decision making at a minimum basis. Because small shareholders have little influence on decision making, the managers then hold the control of the firm, who possess both the opportunities and incentive of misusing their position. It is therefore concluded that corporate performance would be adversely affected by the ownership-control separation (Laiho, 2011; Hamdani and Yafeh, 2010; Leech, 2001).

Laiho (2011) states that a more effective monitoring takes place through a more concentrated ownership in the form of large shareholders. Effective monitoring has two significant obstacles that may be solved by large shareholders: staying informed to enable reaping sufficient benefits towards exceeding the costs of obtaining the needed information; and possessing an adequately large share of the votes in order to influence corporate outcomes (even in circumstances of minority holding). Small shareholders, on the other hand, have difficulty carrying this out collectively as they are only able to internalise a small aspect of the potential gains and endure free-rider problems. An agency problem identified here is therefore the incentive of large shareholders to gain private benefits at the detriment of the small shareholders (Laiho, 2011; Kaisanlahti, 2002; Bebchuck, 1999).

Moreover, control by a large minority shareholder takes place if wide distribution of the remaining shares is carried out amongst a mass of small shareholders where the outcome of a vote is likely determined. Generally, it is likely that the small shareholders' votes are cancelled out, to which the power of decision is given to the large blockholder (Leech, 2002; Means, 2008).

It must be noted that the idea concerning the impact of ownership structure on firm performance is a question that relates to managerial incentives as well as to those of the owners' and the ability of both of them to control the decision-making stances of the firm. Control in the form of voting rights, which is linked to ownership; naturally take place as a factor because it ascertains whether the firm can be coerced by shareholders to do their bidding (Laiho, 2011).

A position of fundamental authority is enjoyed by shareholders as owners of the firm, paving the way to certain rights in relation to their assets. These rights include decision-making through voting at firm meetings and the right to income from firm assets, amongst others; giving rise to maintaining relationships with the firm. According to Leech (2001), the costs relating to an individual shareholder will be outweighed by the private benefit that accrues to this shareholder, which in fact is caused by correcting management failure subsequent to shareholder action. This assumption can be made of large shareholders but may be considered questionable when applied to small shareholders whose role is very small; however, such assumption may be made as a formality covering both small and large shareholders (Leech, 2001).

Nevertheless, shareholders are collectively composed of a voting body that undertakes collective decision making where each member holds a different number of votes based on his/her holding. This comprises the analysis of formal voting power accrued to shareholders, alongside firm control. Shareholder power in this occasion may be defined according to the result of a hypothetical division as the member's ability to sway any alliance of players. Shareholder power may therefore be considered important to corporate governance even in the absence of large concentrations of share ownership since dispersed power is not necessarily the implied outcome of dispersed ownership (Leech, 2001).

The study of Hamdani and Yafeh (2010) looks into the role of corporate governance in the market with prevalent concentrated ownership. When controlling shareholders exist in a firm, only a limited role can be played by minority shareholders in corporate governance. It is suggested that the absence of conflict of interest rather than minority shareholders' legal power for institutions to be able to undertake their corporate governance role. The idea whether firm performance makes a difference to ownership structure is put forward by Laiho (2011). The agency theory serves as the starting point of the analysis where it is predicted that firm performance improves with higher levels of managerial ownership structure, and this is caused by incentive effect. It is also suggested that dominant owners

might extract the firm's resources at the expense of other shareholders due to high ownership concentration. Laiho (2011) also infers that the role of ownership structure may also be analysed besides agency costs that managers generate. It is assumed that there is a propensity for high-ownership owners to use their position to obtain private benefits. These benefits include takeover defence for insiders and consumption of the firm's goods. If adverse effects are generated by these benefits on firm performance, there is a possibility for ownership concentration to hurt performance. It boils down to the idea that not only does agency problem exist between owners and managers because the same terms can govern the relationship between large and small shareholders. It must be noted that the idea concerning the impact of ownership structure on firm performance is a question that relates to managerial incentives as well as to those of the owners' and the ability of both of them to control the decision-making stances of the firm. Control in the form of voting rights, which is linked to ownership; naturally take place as a factor because it ascertains whether the firm can be coerced by shareholders to do their bidding (Laiho, 2011).

In the work of Bebchuck (1999, cited in Laiho, 2011), a theory of ownership concentration is designed based on the controlling owner's potential private benefit extraction, demonstrating that this decision is dependent to the size of the private benefits of control. In cases of large potential private benefits, the initial owner holds an incentive to capture the benefits and bar potential outsider takeovers. Bebchuck's model suggests that ownership concentration tends to be higher in countries with large private control benefits and likewise explains the reason why low ownership concentration occurs in some countries. Moreover, Laiho notes that small shareholders are less likely to monitor the management than do large shareholders as the latter is able to internalise a larger part of the monitoring costs and also possesses adequate voting power in influencing corporate decisions.

It is also significant to consider that the rights of minority shareholders, according to recent research on law and finance, are broadly impacted by the legal tradition, creating an economic impact on the ability of the firm to increase outsiders' equity capital (Kaisanlahti, 2002).

The vulnerability of minority shareholders is emphasised in some research, whereby little regard for incorporation's *ex-ante* motivations is looked into. It is said that majority of shareholders are placed on enhanced fiduciary tasks expected of partners, acting towards the close corporation as a partnership garbed in corporate shape. This approach omits the differences between partnerships and corporations, whereby uncertainty is created in terms of whether the corporate shape will be

honoured or whether the corporation is to be served by the majority so that the interest of the minority may be addressed (Means, 2008).

3.3 Corporate Governance and Market Competition

There is scarce evidence on the interaction between corporate governance and product market competition (Keasey *et al*., 2005; Allen and Gale, 2000). The evidence states that firm performance is enhanced by the level of corporate governance and product market competition. In a particular study, the degree of market competition is said to be linked to high productivity growth. In addition, it is concluded that competition may be seen as a substitute mechanism to internal control (Keasey *et al*., 2005).

The study of Nickell (1996) illustrates the improvements in productivity development through product market competition, whereas Robinson and Hou (2006) give evidence for the higher returns of competitive industries as compared to concentrated industries. The shareholder rights are distributed in a different proportion in each industry with some industries having greater rights than others, as Johnson *et al*. (2009) has stated. Once the industry effects are controlled, those firms that have stronger rights of shareholders gain no abnormal benefits than those that have weaker rights. The measurement of quality of corporate governance through the entrenchment index of Bebchuk *et al*. (2009) gives consistent results. Hence, quality of governance is affected by the characteristics of the industry. Those corporations that belong to competitive industries possess better structures of corporate governance according to Karuna (2007) who measures industry level competition. He states that managers in competitive industries need to be monitored closely as they have the discretionary power to come up with competitive strategies for their firm.

Nevertheless, it has been found by Cremers *et al.* (2008) that shareholder rights are weak in competitive industries, and that it is the long-term relationship with customers that creates the industry effect on corporate governance. Customers face problems when they have to change their service providers in case service providers are taken over by some other organization. This is especially true for the firms of competitive industries as they have long-term associations with their customers. Hence, the customers concern of survival is lessened by the firms through shareholder provisions that limit the rights of shareholders.

Guadalupe and Pérez González (2010) have carried out a fairly similar study which shows indirect support for the impact of industry features on the quality of corporate governance. Their study used publicly traded data of 19 countries and revealed that low private benefits of control come about through high competition. The executives and owners in a domestic industry attain fewer benefits for themselves being in charge of their corporations when the global market poses strong competition. The evidence from literature indicates that corporate governance is improved through competition and hence decreased benefits are considered to be a sign of efficient governance structures.

Better transparency of information for firms in the same industry and the top management's fear of bankruptcy create the impact of competition on corporate governance as Guadalupe and Pérez-González have concluded. Past literature offers these two major theories with respect to the influence of product market competition on corporate governance. However, there has been no study so far which gives concrete evidence that explains the effect of competition on management in the most accurate manner.

Hopt *et al.,* (1998) state that one may see that market competition can be substituted by tight corporate governance. A well-functioning corporate governance system would be expected in an economy with little market competition since overcoming the lack of market competition necessitates tighter discipline. In contrast, it is also reasonable to assume a complementary status between corporate governance and market competition, which has been described also by Keasey *et al.*, (2005).

Van Frederikslust *et al*., (2008), alternatively, point out that intensive competition in product markets leads to a possibility of the mode of corporate governance becoming less important. Competition compels firms to adopt efficient governance structures apart from cost minimising methods of production. Slack firms will be driven away from the market by more efficient firms who will steal business from them. In the long run at least, upon entry facilitation, inefficient structures are eliminated by this selection effect of competition, where effective governance is eliminated. Eventually, the forces of competitive markets may simultaneously determine the mode of corporate governance (Van Frederikslust *et al.*, 2008). It must be noted that the proper functioning of a market economy may require the presence of an effective corporate governance system within each individual firm and the economy as a whole (du Plessis *et al*., 2011).

Moreover, it is important that a framework be adopted in order to understand how economic performance and firm behaviour are affected by corporate governance. A principal-agent relationship in corporate governance takes place when a person owning a firm is different from the one who controls or manages it; hence, a separation between ownership and control exists. However, firms must be provided with incentives by product market competition in order to employ the most efficient mechanisms of corporate governance. Market participants are needed to address the continuous occurrence of slack firms being replaced by more efficient firms rather than justifying public intervention. Hence, market responses to institutional inadequacies are through recent managerial labour market developments, such as corporate control market (McCahery, 2002).

Alternatively, the market failures taking place from asymmetric information within the realm of corporate governance cannot be solved by competition alone. It is important to note that several factors may influence the effectiveness and form of various systems of corporate governance, and product market competition is one of these (McCahery, 2002).

In a study of Januszweski, *et al.*, (2002), they find out that firms tend to experience higher productivity growth when they operate in markets with intense competition. Moreover, higher productivity growth is indicated for firms controlled by a strong ultimate owner, but this is not the case however if the ultimate owner is a financial institution. The authors also suggest that tight control and competition are complementary, which has been mentioned also earlier by Keasey *et al.*, (2005) and Hopt *et al.*, (1998), which means that a strong ultimate owner enhances the positive effect of competition.

According to Kole and Lehn (1997), firms surviving in the competition are assumed to have optimal governance structures. Those who are not able to adapt their governance structures to changes in the business environment are likely to lead to demise, resulting in a "natural selection of efficient organisational forms" (p. 421). There is little research about how governance structures evolve – whether they are stable or change over time; whether they adapt to sudden changes in the business environment and how quickly if so. There is limited understanding of these issues at present (Kole and Lehn, 1997).

In their study, Giroud and Mueller (2011) indicate that firms with weak governance in non-competitive industries tend to have lower firm value and equity returns. The causes of the efficiency

are examined, and the authors find lower labour productivity and higher input costs taking place amongst firms with weak governance, but this occurs in non-competitive industries only. It is also found out that activist hedge funds are more likely to target firms with weak governance in non-competitive industries, indicating that investors work on mitigating the inefficiency. Next section will shed some lights from the literature on the possible relationship between corporate governance and cartel formation.

3.4 Corporate Governance and Cartel Formation

There are different types of illegal activities such as collusion between agents and supervisors (e.g. between auditors and management or regulators and regulated firms), large scale frauds (including financial ones), illegal trade such as of arms, people trafficking and drugs, where at least a buyer and a seller frequently interact, and long term corruption (where at least two parties are continually involved, a bribery and a bribe). All these illegal activities lead to tremendously high social costs to the society (Spagnolo, 2004). Cartel would also be considered an illegal activity involving many agents thereby describing it as a type of organised crime, but not the most detrimental. The incentive structure of all these activities that is made for all the agents who are part of it is similar to that of cartel (Gonzalez and Schmid, 2012).

It is the main aim of managers to make profits and they are accountable to shareholders for their performance. There would be increased profits if cartel participation is successful. This is because the firm would be able to raise the price at more than competitive levels of pricing. The profit is increased because the margin between price and marginal cost is increased. Since there is low visibility in the actions of managers from shareholders, the managers have the most advantage in this classic cartel formation. Both shareholders and managers get the advantage of being part of a cartel as share value of the firm rises through increase in earnings of the firm. As per the remuneration system of the firm, the managers also receive part of the increase in earnings. Moral hazards could be a reason for formation of cartel; this is because incentives might not be aligned since between the agent and the principal, the costs and benefits are not allocated equally. (Spagnolo, 2005 and 2007)

According to Gonzalez and Schmid (2012), the board of directors and the CEO have direct involvement in their firms' potential collusive price fixing agreements. Hence, it is pondered whether a significant relationship exists between corporate governance and the probability for a firm to

participate in a cartel. In particular, collusive agreements and hard-core cartel membership may be facilitated or prevented by certain corporate governance structures, which is seen in such examples as weak board of directors, strong performance-based incentives received by top managers, and top-level high concentration of power.

Gonzalez and Schmid (2012), infer based on theoretical research that a firm's decision to participate in a cartel is influenced by potential profits from price fixing as well as problems on management incentives. Using samples of U.S cartelist firms within a period of 1986 to 2010, the study made an empirical investigation of the relation between the probability of cartel participation on one hand, and a range of corporate governance and other firm and market characteristics, on the other. The results indicate that it is likely for large and mature firms in concentrated industries to engage in cartel participation. There are however no findings between cartelistic behaviour and corporate governance despite the significant relationship between a few corporate governance mechanisms. Moreover, top executives tend to carry out a significantly higher portion of their exercisable options during collusive behaviour than what CEO and executives of benchmark firms exercise (Gonzalez and Schmid, 2012). Gonzalez and Schmid offer a discussion that provides an important insight on firm's participation in a cartel, which is contributory to this research.

In the study of Buccirossi and Spagnolo (2007), it is pointed out that factors of corporate governance play a critical role in ascertaining a firm's behaviour towards competition as well as in identifying the key players in its judgement to take on an anti-competitive behaviour. The focus of their study is to investigate the relationship between corporate governance and how cartel are formed, as well as the manner in which factors of corporate governance impinge on the optimal implementation of antitrust law against cartel (Abreu *et al.*, 1985).

Buccirossi and Spagnolo (2007) define corporate governance as institutional arrangements intended to keep under control the agency problems of a firm and to lead managers to prioritise the pursuit of shareholders' interests rather than their own. They infer that competition acts as the main force disciplining firms by maintaining their responsiveness to the markets, encouraging them to employ competent practices and to maximise efficiency. Amongst the means through which corporate governance and performance may be improved by product market competition are firm selection, efficient firm management, relative performance evaluation, and rents reduction. The authors suggest that managers are forced by effective competition to take on efficient firm management to ensure that

the firm survives in the competition and hence avoid the possible loss of their jobs. This point provides an insight that there is a direct relationship between management performance and firm survival (Buccirossi and Spagnolo, 2007).

Further Buccirossi and Spagnolo (2007) state, that important strategic impacts are placed by contracts with third parties. These contracts refer to corporate governance variables, such as financial arrangements and incentive systems for managers. Accordingly, research indicates that decisions for cartel formation typically begin at the highest level of the firm hierarchy, which are then implemented through issuance of instructions to lower level management hiding the collusive arrangement.

According to Lin (2001), corporate governance is said to comprise market competitiveness as an external mechanism. Full nationwide competition might be obstructed by several administrative barriers which in turn constrain product market competition. The dominance of state-owned firms taking over a particular market mirrors an oligarchic structure. Massive market power is enjoyed by these large conglomerates, which can possibly lead to cartel operation (Lin, 2001).

In contrast, Larcker *et al*., (2007) deal with the fact that no consistent set of results had been produced for the empirical research studying the link between measures of corporate governance and a range of economic and accounting outcomes. They believe that this is in part attributed to the difficulty in generating reliable measures for corporate governance. The authors find out through an exploratory principal component analysis that corporate governance has 14 dimensions and that these indices are associated with abnormal accruals. Moreover, the findings indicate slight relation to accounting restatements but can explain future operating performance (Larcker *et al.,* 2007). This research is useful to the topic under study since it provides insights on the internal organisation of the firm, specifically economic and accounting areas, which are attributes of corporate governance. The importance of these outcomes is seen in the firm's ultimate decision to enter into a cartel.

Moreover, there is evidence showing the influence of corporate governance and firm-level competitive behaviour. First of this is the fact that a substantive role is often assumed by the board of directors in the strategic decision-making process of the firm, as shown by management research literature (Judge and Zeithaml, 1992). Second is the fact that a firm's competitive behaviour is influenced by two ultimate drivers (Chen, 2008; Chen *et al.*, 2005): The motivation of the firm to

involve itself in competitive pursuits, and its capacity to do so. Subsequent to this logic, corporate governance mechanisms have a range of elements affecting a firm's motivation and capability to pursue competitive actions.

Agency theory states that managers possess a certain degree of economic self-interest that may not be consistent with those of the owners (Fama and Jensen, 1983). This would lead the firm to take sub-optimal strategic actions since the managers' personal motivations are misaligned with the shareholders' economic interests (Eisenhardt, 1989).

On one hand, it is a reasonable stance to anticipate that effective corporate governance, which in significant aspects serves as an agency remedy, should offer assistance to the firm to undertake optimal strategic actions to achieve sustainable competitive advantage. On the other hand, the board of directors serves as a corporate governance mechanism that plays a unique role. The board's advisory and service functions indicate that the board of directors can function as an important organisational resource, which can affect directly the firm's capability to carry out competitive actions (Chatterjee and Harrison, 2001; Mace, 1986).

If board of directors and other mechanisms of corporate governance have the ability to influence the way in which firms compete, there are certainly various aspects of corporate governance influencing the competitive behaviour of the firm. Consequently, if agency remedies perform effectively, optimal competitive actions undertaken by effective managers must be expected, considering the presence of favourable strategic opportunities (Hutchinson and Gul, 2004). In addition, the board of directors can function as supplementary means to enhance the firm's capability since directors have valuable social and human capital that is deployable by the firm in its quest to engage in competitive actions (Hutchinson and Gul, 2004).

The insufficiency of explaining the occurrence of collusion cannot be addressed by limiting competition since collusion is more difficult than what can be assumed. Cartel is by nature changeable because they constructed the incentive to cheat. In terms of increased market power, cartel might be surpassed by long-range contracts with tacit oligopolistic collusion if these cartels involve important external competitors or are besieged by internal competition (Fear, 2007).

Fear (2007) has presented a discussion on cartel and its nature, and the corresponding corporate governance embodying it, making the study relevant to this research. Fear's stated that the cartel issue had always involved certain assumptions about business behaviour, trust, and reputation, amongst others. These assumptions finally led to economists wrestling with industries' implications that are beset by fixed costs and competitive behaviour. The way economists wrestle with these implications is by debating trust and cartel formation as they raised issues about corporate governance; such as the issue on the social impact of big businesses and the issue of ownership-control separation.

3.4.1 The CEO and Cartel Formation

The management of the organisation is required to enforce cartel agreements (Spagnolo, 2005) and the decision to actually form the cartel is taken by the top management (Harrington, 2006c). The CEO, Board of directors and top management are all involved in the collusive price fixing agreements, which are formed by their firms as part of the corporate governance discussions. Hence, it is necessary to understand whether the corporate governance within a firm helps determine if a cartel should be formed. Many organisations may not want to carry out this hard-core activity and establish collusive agreements. Cartel participation increases if the board of directors is weak; if most power is exercised by the top management level; and if the incentives provided to the management depend on their performance levels (Spagnolo, 2005).

When cartel is formed, senior managers benefit from it through bonuses and stock options. These are both kinds of financial benefits which in turn assist in collusive activities and its maintenance (Buccirossi and Spagnolo, 2007). Thus, according to studies conducted recently, it is through senior management that the decision of being part of a cartel is made (Harrington, 2008).

Thépot (2011) stated that when there is more effort required from an agent, there is more motivation to find an alternative in its place and that would be forming cartel. So if shareholders want to reduce the motivation of managers to be part of cartel, they would have to decrease those benefits that lead to the alternation of efforts through collusion. This method affects those issues that are related to certain remuneration packages such as allocation of stock options. Also it affects the welfare that is not considered when the whole system does not consider agency relations and the factors causing

collusion. Thus opportunism occurs due to the fact that a manager has natural incentives to alternate illegal market conduct for effort (Ibid, p 5).

According to Gonzalez and Schmid (2012), the board of directors and the CEO have direct involvement in their firms' potential collusive price fixing agreements. Hence, it is pondered whether a significant relationship exists between corporate governance and the probability for a firm to participate in a cartel. In particular, collusive agreements and hard-core cartel membership may be facilitated or prevented by certain corporate governance structures, which is seen in such examples as weak board of directors, strong performance-based incentives received by top managers, and top-level high concentration of power.

It is worthy to note that a more competitive attitude is induced amongst managers by stock-based incentives because these incentives link the present compensation of managers to the expectations of stock markets on the future profitability of the firm. When there is breaking of a tacit collusive agreement and competitors happen to detect it, the negative effect of the breach is anticipated by the stock market, specifically the effect on the future profitability of the firm, which is linked to the impending price-war period. The result is that the negative effect is right away discounted on the stock price, leading to managers' reduced short-run gains from deviation. It is important to note that cartel may be strongly destabilised by stock-related compensation, leading managers to provide extensive emphasis on short-range results. It may be expected that this would result in destabilising cartel through increased valuation of short-term gains by managers from their unilateral defection. Such defection is from collusive strategies associated with prospective long-term losses. Note that these losses are caused by the price wars set off by defections once found out by members of the partner cartel (Buccirossi and Spagnolo, 2007).

Buccirossi and Spagnolo surmise that considering a firm's financial performance, a period of five years may be viewed as short-term, but for cartel having five years average estimated duration, a five-year period is considered long. Hence, the stock-based compensation tends not to be deterred by short-termism, which means that the firm managers' short-term objectives are adequately long-term when cartel' average life span is considered. A high discount rate on future costs are even taken by managers as these costs are indicative of defecting from the cartel scheme and may be too large to become significant in present value. This would mean discouraging defections despite the short term. Ironically, large stock-related incentives cannot guarantee competitive behaviour and may in truth

likely to smooth the progress of collusive behaviour by enabling stability amongst cartel (Buccirossi and Spagnolo, 2007). This assertion only supports the common knowledge that the manner in which firms must organise their relationships with each other is not at all based on pure competition but by cartel formation and promotion (Hopner and Krempel, 2004). Buccirossi and Spagnolo have provided a useful and insightful discussion on the relationship between corporate governance and cartel formation, which is relevant to the topic being studied.

The study of Aubert (2007) harmonises with that of Buccirossi and Spagnolo as both have focused on managerial effort incentives as well as their relation with cartel formation. Aubert examines how managers' incentives to collude interact with their incentives. The firm's competitive strategy is privately chosen by a manager along with exerting efforts to enhance productivity; and his pursuit to increase profits may lead him to replace effort with collusion. The idea is that it would be more attractive to participate in a cartel through high profit targets such as in the form of strong effort incentives. The study point out that to neglect the issues on internal incentives is to underestimate welfare losses due to cartelisation. Even in the absence of collusion, the new cost of potential collision (internal inefficiencies in firms that collude and compete) involves fostering internal efficiency by benefiting from antitrust intervention (Aubert, 2007).

Aubert's findings indicate that managers can be prevented from colluding by providing them with weak incentives so that they may exert effort, when antitrust sanctions cannot be expected to deter sufficiently. This suggests that collusion enables saving on effort, which is considered more preferred for high-effort levels, considering the marginal cost of effort in its increasing stance. Owners decrease the gain obtainable by managers through collusion by decreasing the target profits or the demanded level of effort. In an attempt to avoid cartelisation, sacrificing internal efficiency can thus be resorted to by owners. It means that social losses may be generated from the potential of collusion by managers, which is caused by inefficient levels of effort despite the firms' non-collusion in reality. In contrast, firms in favour of cartel formation needs to also request low effort levels that are considered inefficient so that deviations from cartel agreement may be deterred. It is worthy of mention here that when it becomes attractive to collude, so is it to deviate, since deviating would allow the firm to have more savings especially on the cost of effort, i.e. during high profit targets. Hence, albeit colluding to save on effort is the natural incentive of managers, it would be difficult for colluding firms to induce effort once they have considered all incentive issues. Inefficiently low or high levels of effort are in fact always requested by colluding firms; whilst this is not the case for

competing firms who may take on efficiently full operations as long as there are high enough individual sanctions. Apart from effort distortions, an information rent must be paid by colluding firms to managers, which may also be done by competing firms in the presence of very low expected individual sanctions (Aubert, 2007). Aubert's study is related to this research report as it tackles collusion, managerial effort incentives, and cartelisation and can thus contribute to addressing the identified set of hypotheses.

Burhop and Lubbers (2008) conduct an analysis on how productive efficiency is impacted by cartelisation and managerial incentive schemes, with particular focus on coal mining corporations in Ruhr district, Germany. It is found out that product efficiency is not affected at all by cartelisation. The authors claim that only when corporate governance variables (e.g. the quality of corporate governance; proxies for product market competition) are taken into account can the impacts of cartel formation of productivity be fully justified. This is seen in the idea that managers must be motivated if there is asymmetric information between managers and shareholders. Product market competition is influential to how these managerial incentives must be optimally designed; the underlying idea is that designing incentives optimally becomes difficult if managers view monopoly profits as those that result from their own efforts, which would lead to a more diffused signal received by the principal (owner of the firm). Further, firms' bankruptcy risks are reduced by low market competition, which hence leads to the likewise reduction of managers' lay-off risk, and which might lead to reduced managerial effort and firm efficiency. However, managers still exert effort on the firm if they receive a share of the profit. Since low market competition involves higher marginal return of managerial effort, managers would resultantly increase their effort, which would essentially lead to a corresponding increase in the efficiency of the firm. Similarly, the principals can enable counteracting the negative correlation between market power and bankruptcy risk through the selection of the firm's financial structure. Moreover, the debt-equity ratio increases vis-a-vis bankruptcy risk; hence, increasing debt in relation to equity can be carried out to counteract the effects of market power on the managerial effort. Therefore, it is when variables of corporate governance are considered can the impacts of cartel formation on productive efficiency be fully explained (Burhop and Lubbers, 2008).

Burhop and Lubbers state that if managers prefer a quiet life than the difficult profit-maximising life offered to them, lower productive efficiency would be demonstrated by cartelised firms in which they are connected. This hypothesis is tested by the authors by using data from coal mining corporations

covering a period of 32 years through a stochastic frontier model. The findings suggest that cartel membership does not have a significant effect on the productive efficiency of these corporations. Productive efficiency is not also affected by a high-debt equity ratio; instead, it demonstrates higher rates in firms' offering of large bonuses to their board members. This only suggests that it is more important to uphold compensation schemes than consider competitive pressures from product markets when productive efficiency is taken into account; neither is the higher bankruptcy risk of high-leverage firms more important than compensation schemes when considering such efficiency. When corporate governance variables are controlled, it is found out that significant correlation exists between stronger managerial incentives and product efficiency (Burhop and Lubbers, 2008). Burhop and Lubbers' study provides substantial insights relevant to this research and likewise enlightens the reader on several relationships governing corporate governance.

A study by Han (2010) examines short-term and long-term employment contracts and their effects on cartel stability. The study shows that firms are more likely to be involved in cartel agreement when CEO tenure (short-term employment contract) is low or when CEO turnover is high. Han shows that a short-term contract provides stability to a cartel formation more than a long-term contract. If a certain profit margin is achieved, only then is the short-term contract renewed. With the help of this activity, firm performance is enhanced and defection from the collusion has taken place, which diminishes the chances of being laid off. Firm performance may be hindered due to any kind of future punishment potentials which is why the chance of being laid off increases. The stability of cartel is influenced by these re-employment trade-offs which are tangled with the monetary trade-offs. A long-term contract does not affect stability when the fixed salary components are applied. The fixed components affect the short-term contract to an extent. Cyclical collusive pricing also takes place due to the short-term renewable contracts that may be extended after a certain period of time. It is also observed that equity-financed firms are not able to provide as much stability to cartels as much as debt financed firms.

3.4.2 The Shareholders and Cartel Formation

As discussed earlier in this chapter, when cartel is formed the senior manager benefit from it through bonuses and stock options (Spagnolo, 2005). The agency theory perspective holds that corporate governance has a clear implication of establishing adequate control or monitoring in order to protect shareholders from the conflict of interest occurring in the management. Eisenhardt (1989) clearly

states that the conflict occurs when the goals of principal (owners) and the agents (managers) are different and it becomes costly for the principal to actually verify the activities of the agent.

However, being part of cartel is sometimes an advantage to the whole firm which includes shareholder regardless to the consequences of forming cartel and discovering it by the legal authority, this lead us to the *question "what are the conditions under which cartel formation might be in the interests of shareholders ?"*

According to Thépot (2011) there are two reasons for the interest of the owner in being part of collusive activity. One reason is that shareholders might be encouraged to give an agent benefits to be part of such activity due to certain corporate governance issues. Another reason is that collusive activity is an advantage to the whole firm as it increases earnings. It has been mentioned earlier as well that being part of cartel is an advantage to the whole firm and is therefore of interest to the owners. However, at times, managers might not benefit from cartel formation, which is why such illegal activity could be due to the owners' own motivations (Mullin and Snyder, 2005).

Through these illegal activities, the aim of increasing expected return can increase the shareholders' wealth. This is through the way that due to decrease in firms' risk and/or rise in expected return, the value of the firm's shares increases. Thus, there are two ways through which shareholders receive advantage from such unfair activities, expected-return increases and reduction of risk (Cloninger, 1985).

In a study of McAfee, Vincent, Williams, *et al.* (1993), it is found out that the collusive agreements of hostile takeover bidders had no significant effect on the target's price. A welfare analysis suggests that social benefits can be accrued to a positive probability of cartel formation; however, the same may or may not be beneficial to the target's shareholders. This provides useful insights on the prevailing policy debate relating to collusive agreement regulations. However, Davis and Thompson (1994) identify the conditions where shareholders' interest is considered in cartel formation: engagement in shareholder rights, CEO selection, determination of executive remuneration, and decision-making processes. According to them, activist shareholders expand their demand from merely engaging in shareholder rights, to such concerns as choosing CEOs as well as determining how much executives are paid.

Geradin (2004) offers another set of conditions where shareholder interest might be considered in cartel formation. He points out that these conditions are: the position to claim for compensation in such event that a cartel is successful in excluding a firm, and to oversee a proceeding to correct the wrong, which is an exclusive interest of shareholders. He states that in cases that a cartel aims at a new market entrant and has been successful in excluding a firm, claiming for compensations will not be a position of anyone in the absence of shareholders. Bringing proceedings to correct the wrong may only be an interest exclusive to shareholders. This is aligned to the idea that shareholders are in effect active owners of the firm whereby they take part in its top decision making (Leech, 2001).

3.5 Theoretical Background

The empirical investigation in this research builds explicitly upon agency theory in order to understand the empirical relationship between corporate governance structure and cartel formation.

3.5.1 Agency Theory

The Agency Theory is based on the modern corporations and how the principles or owners of the corporations are separated from the agents who are the managers. In the modern organisation, management is not carried out by the shareholders but is diversified to other agents. These agents are responsible for the daily operations of the organisation. It is due to this separation of ownership and control that several issues may arise within the organisation. Resolving these issues may prove to be costly for the shareholders (Jensen and Meckling, 1976 Eisenhardt, 1988). The basic problem associated with agency theory is that the management who is responsible for control is involved in pursuing self-interest. The manager is only motivated to provide extra ordinary efficiency levels when he is provided with some kind of personal gain. They pursue their personal interests and not the interests of the organisation or the shareholders. For instance, they may be attracted towards the purchase of comfortable and expensive office equipment only because the cost is borne by the owners and they would reap the benefits (Eisenhardt, 1988).

The agency theory perspective holds that corporate governance has a clear implication of establishing adequate control or monitoring in order to protect shareholders from the conflict of interest occurring in the management. Normative recommendations are directed to the concept that different persons should occupy the positions of independent directors and of the chairman and CEO. The agency theory is in contrast with the stewardship theory, which views that managers are essentially

trustworthy and manage efficiently the resources that the firm has entrusted to them (Nicholson and Kiel, 2003).

Hence, it is the basic concern of the shareholders that the management is motivated enough to not only pursue their own interests but also increase shareholder wealth. Eisenhardt (1989) clearly states that the conflict occurs when the goals of principal (owners) and the agents (managers) are different and it becomes costly for the principal to actually verify the activities of the agent These principals do not have the ability to efficiently monitor the activities of the agents (Jensen and Meckling 1976).

When the management is engaged in pursuing self-interest, the costs of the organisation increase since the decisions are not efficient and the formation of contracts is not relevant to shareholder wealth. Hence, the earnings of the organisation are highly affected by this problem (Leuz *et al.*, 2003).

A proposal has been brought forward by Fama and Jensen (1983) to resolve the issue of agency costs due to the separation of ownership and control. They believe that by introducing two separate programmes of decision management and decision control, it would be possible to resolve the problems. The opportunistic behaviour that is carried out by the management can be contained by introducing the corporate governance mechanism (Fama, (1980), Fama and Jensen (1983), Williamson (1988) and Shilefer and Vishny (1997).

This mechanism should be based on internal and external controls to have a reduced effect on agency costs (McKnight and Weir, 2009). With the help of these internal and external mechanisms the principal and agent goals can be aligned along with reducing the costs and increasing shareholder wealth (Weir *et al.*, 2002; Roberts, 1985; Davis *et al.*, 1997). Many authors, including Demsetz and Lehn (1985), believe that corporate governance not only aims to improve the performance of the organisation but also monitors the management behaviour and enhances the efficiency of the financial reporting process. This concept has the ability to mitigate the costs associated with management self-interest and align the managers' interests with the shareholders'.

Thepot (2011) examined the relationship between leniency policy and individual liability - two instruments on competition policy enforcement. Such examination is done by analysing the interplays amongst the cartel members and the interplays within each firm. A two-dimensional system serves as

the transformation of these instruments; namely, the horizontal dimension, which the cartel members themselves have formed; and the vertical dimension, which the interaction of cartel members has constructed. The basis of analysis is the theory of the firm, where their ownership-control separation is upheld, as well as the agency theory, which is based on the assumption of the inevitable problem of moral hazard between the owner and the manager. The argument is pursued along the literature on collusive agreements, individual liability, and leniency policy. Insights on corporate governance vis-a-vis cartel are also carried out by the economic literature using game theoretical approaches. Theoretical insights will aid in understanding the link between cartel activity on one hand, and agency and governance issues on the other (Thepot, 2011). Thepot has provided a useful discussion for this study as he links the interaction between cartel and corporate governance, making it relevant to the topic being investigated.

Many authors have also suggested that corporate governance is not as effective and that alternate strategies of control such as performance evaluations, audits, etc., should be introduced. This would not only monitor the activities of the organisation but will also reduce agency costs associated with it (e.g., Davis *et al.*, 1997). However, to implement efficient governance practices, it is essential that the board members are independent in making their decisions and have no personal contact with the management. The board should consist of non-executive directors (NEDs) to handle all management issues. A separate officer should be assigned for this purpose of aligning the interests of the management and the shareholders' (Donaldson, 1990; Dalton *et al.*, 1998; Coles and Hesterly, 2000; Daily and Dalton, 1997).

Many of the researches that have been found highlighted the importance of agency theory in the study of corporate governance. The earnings management practices of the firm and the role of the board of directors are very much related to governance mechanisms (Xie *et al.*, 2003; Kao and Chen, 2004; Davidson *et al.*, 2005; Benkel *et al.*, 2006 and Goodwin *et al.*, 2009).

To carry out an effective decision control system, establishing an audit committee is important. This would help in the internal monitoring system of the organisation (Fama, 1980 Fama and Jensen, 1983). It is not only the internal monitoring that is important but also the external auditing process that requires a committee (Bradbury *et al.*, 2006) and integration of NEDs (Fama, 1980; Anderson *et al.*, 1992). The governance mechanisms have been found to be much more efficient and cost effective than the process of takeovers (Fama, 1980). The management interests should be pursued along with

the interests of the shareholders to make sure that the organisation prospers (Davis *et al.*, 1997; Tosi, *et al.*, 2003).

The external audit members are to be independent from the firm so that he may reduce the problem of information asymmetry in financial reporting. This would then reduce the agency costs associated with the monitoring process (Poit, 2001). Hence, with the help of monitoring and good governance practices it is possible to reduce any kind of fraudulent behaviour that may take place in the organisation. Agency theory and external auditing are two of the most important mechanisms of corporate governance practices. Both have the ability to reduce the agency costs and any kind of opportunistic behaviour that may arise from within the management (Watts and Zimmerman, 1986). The monitoring activities are in behalf of the shareholders and the independent auditors ensure that neither the management nor the owners pursue only their self-interests.

Taking agency theory into consideration, the cartel may be indicative of an agency problem. As a consequence, enhancing corporate governance should result reduced practice of the cartel formation. Given these agency assumptions, independent variables will be identified with the aim of detecting associations between corporate governance attributes and cartel formation.

3.6 Hypothesis Development

The above literature review shows that there is a potential relationship between cartel formation and corporate governance attributes (Spagnolo, (2005); Han (2010); Aubert, (2007); Gonzalez and Schmid (2012); Harrington, (2008)).Therefore, a broad range of literature that has been conducted over the past decades on a variety of corporate governance topics is reviewed in order to draw a clear picture of what board and CEO characteristics could be associated with cartel formation. However, there is certainly no clear negative or positive relationship between what is regarded as good corporate governance in the literature and the likelihood of firm engaging in cartel agreement.

This section reviews the empirical literature related to board characteristics, ownership structure of the board, CEOs characteristics, and CEO compensation scheme. The focus will be on the following characteristics: Board size, directors' age, directors' gender, board duration, independent directors (non-executive directors) and board compensation. The ownership structure: common stock owned by an outside director and family ownership. The CEO characteristics are; CEO age, CEO gender,

CEO tenure, multiple directorships, and CEO concentration power. This section also reviews the literature on CEO compensation schemes (share, bounces, etc.) Although this list is comprehensive enough to capture the most important board and CEOs characteristics identified by the literature; it is by no means exhaustive (for recent studies of other board characteristics see for example Bebchuk and Cohen (2005)).

3.6.1 Does Board of Director Characteristics Matter?

- **Board Size**

The importance of limiting the board size is a global consideration and this is due to the workloads being required; however, only slight empirical evidence is available to support this view. Rather, a strong tradition persists in terms of supporting many directorships as a firm's tool to appoint external resources (Kiel and Nicholson, 2006). The findings undertaken by Kiel and Nicholson in their study suggest a low incidence of several directorships. They indicate that the reasons of many examples of several directorships relate to entities, the nature of these entities, and lower workload requirements as outcome of such nature. In addition, the findings suggest a lack of apparent relationship between the financial performance of the firm and implementation of several directorships. Finally, the authors tackle the implications for boards and the importance of ensuring governance recommendations and guidelines.

Moreover, managing a large board of directors in an organisation can prove to be costly (Lipton and Lorsch, 1992; Jensen, 1993). Due to the fact that the members are in large number, it is possible to have disagreements and difficulty in performing efficient roles. As the number of board members increases, the internal conflict problem increases along with the agency issues, and the communication and coordination activities amongst the board members become weak (Eisenberg *et al.*, 1998). Eisenberg and colleagues indicate that such number must be as small as not to allow conflicts to thrive as well as not to weaken communication and coordination activities amongst board members.

The Evangelical Council for Financial Accountability (ECFA) provides a mandate that the number of directors must be at least five and that the board must determine the optimal board size based on the needs of the organisation. The Standards for Excellence Institute also mandates a minimum of five directors, but they consider it preferable to have seven or eight directors. At least five directors are also proposed by the Committee for Purchase and the Panel of the Independent Sector. The Internal

Revenue System (IRS) holds that very small or very large boards may be problematic since small boards might fail to represent public interest whilst large boards might fail to do their duties and responsibilities (Hopkins and Gross, 2009).

According to the OFT 2011, directors in small firms might have more hands on involvement with day-to-day business practises of their firm, and therefore they might be more knowledgeable of any actual or potential breach of competition law. In contrast, directors in large firms might not be as involved as the directors in smaller firms.

In a similar manner to this study Gonzalez and Schmid (2012), using a sample of 1,148 firms on 182 different U.S cartels from 1987 to 2009, empirically tested the relationship between the probability of firm involving in cartel and several corporate governance attributes. The results show that mature and large low growth firms are most likely to participate in cartel. Also, large-sized board significantly related to the probability of firm participating in cartel. Gonzalez and Schmid indicate that large boards are capable of such formation.

A research carried out on a large number of U.S. publicly traded firms from Forbes 500 states that there exists an inverse relationship between the number of directors and Tobin's Q. In this research all other attributes like firm size, ownership structure, etc., have all been controlled (Yermack, 1996). Another research carried out on 879 middle-sized and small Finnish firms states the same results. It is also believed that a smaller number of board of directors leads to lower expenses in the funding organisations (Yermack, 1996; Tufano and Sevick, 1997; Dann, *et al*., 2003).

If the board is very large, problems like low levels of motivation or coalitions may occur. The issue of responsibility diffusion also arises when there are large numbers of people to handle similar activities. Hence, it is found that a large board size may negatively affect the coordination activities and group dynamics which are to be extracted for the purpose of organisation development. This has been pointed out earlier by Eisenberg *et al.* (1998). Any decision-making activity may also be hindered due to the fact that a consensus from all members of the board may not be easily met (Judge and Zeithaml, 1992; Goodstein *et al.*, 1994; Eisenberg *et al.*, 1998; Forbes and Milliken, 1999; Golden and Zajac, 2001). Hence, large boards may prove to be much less efficient and hinder the development and performance of the organisation as a whole.

A continued debate goes on in terms of the role of board size according to various perspectives (Dalton *et al.*, 1998; Hemalin and Weisbach, 2003). Board size has been examined by a range of literature from the strategic perspective. Large boards encounter coordination and communication difficulties which hence serve as a hindrance for the board's capacity to advise and be involved in strategic planning (Lipton and Lorsh, 1992; Jensen, 1993). Also, larger boards tend to be less productive and less powerful in monitoring (e.g., Jensen, 1993; Lipton and Lorsch, 1992; Yermack, 1996)

On the contrary, an agency perspective holds that there is a likelihood for larger boards to become aware of any agency problems since a significant number of experienced directors can be deployed to review the actions of the management. Moreover, the agency theory views that effective monitoring is supported by larger boards through the reduced dominance of CEO within the board, which in turn protects the interest of shareholders (Singh *et al.*, 2001).

The bargaining position of the board is enhanced through larger boards, especially in relation to the CEO, which leads to the conclusion that it is more effective to monitor management when larger boards are utilised to do so. Therefore, board size proves to be an essential aspect of boards' ability towards effective management monitoring (Persons, 2006).

Board size indicates its advisory and monitoring responsibilities, which can contribute to management behaviour. Increased expertise and diversity are likely to be exhibited by larger boards alongside increased monitoring capacity of the board (John and Senbet, 1998). In addition, more independent directors tend to be included in larger boards, which results in the capacity of these directors to delegate more responsibilities to delegate more tasks to board committees than smaller boards, which can result in limiting managerial opportunistic behaviour (Xie *et al.*, 2003).

However, the fact that a large size of board members may hinder the growth of the organisation has been proved in literature but it is also essential to understand that a minimum number of board members are required to make sure there is diversity and countervailing power in the organisation. It is necessary to have board members who can deliver balanced representations along with expertise at different levels (Van den Berghe and Levrau, 2002).

In addition, it is found out that the audit committee independence is in fact drawn from the board's size because of increased pronouncement of the probability of having a totally independent audit committee in firms with larger boards (Ebrahim, 2007). It is argued that small board size tends to limit the available independent directors serving the audit committee, alongside the evidence that board size increases, vis-à-vis the independence of the audit committee (Klein, 2002).

There are some who argue that reporting quality is enhanced by larger boards (Chtourou *et al.*, 2001; Xie *et al.*, 2003) whilst there are also those who claim that such is enhanced by smaller boards (Yermack, 1996; Alonso *et al.*, 2000). Some of the shortcomings that may be encountered with large and small-sized boards are increased likelihood for management or outsider dominance. Bureaucracy might also serve as a hindrance for larger boards to discharge their monitoring duties.

The study of Sanchez (2009) aims to determine the extent of effectiveness of corporate governance by analysing how board structure impacts on the technical efficiency of the firm. The study evaluates firm performance by using Data Envelopment Analysis using resembling methods and bootstrapping strategy. It utilises truncated regressions to find out the effects of board characteristics on efficiency. These characteristics are the board's size, reputation, independence, diversity, and activity. The result suggests that the technical efficiency of business tends to increase with a heterogeneous board that involves a limited number of directorships as well as a limited activity stipulated in annual board meetings in decreased number alongside increased number of specialised committees (Sanchez, 2009). This study is relevant to the research as it provides clarification on the impact of board structure on the firm's technical efficiency.

Hermalin and Weisbach (2003) suggest that there is no relation between board composition and corporate performance. However, negative relationship exists between board size and corporate performance. The board's decision to replace CEO has a corresponding correlation with board size and composition. The same correlation exists between board size and composition on one hand, and acquisitions and executive compensation on the other.

Following Gonzalez and Schmid (2012) study that large-sized board significantly related to the probability of firm participating in cartel, also Jensen, 1993; Lipton and Lorsch, 1992; Yermack, 1996, who have argued that the larger the size of the board the weaker corporate control over firm and CEO, therefore, this study examines the relationship between board size and the probability of cartel formation. If cartel agreement can be considered a failure of corporate control, i.e. a failure of

the board to control individuals (e.g., CEO, individual directors), then it should be the case that the propensity to get in the cartel agreement is positively related with the size of the board. To examine this effect, several studies measure board size as the total number of the firm's directors (e.g., Beasley, 1996; Yermach, 1996; Vafeas, 2003; and Coles *et al.*, 2008). This study uses the total number of members on the board as a measure of board size (SIZEBA). Controlling for poor firm financial performance, firm ownership status, current ratio, firm sale, and Herfindahl index, this study tests for the proposition below; a positive and significant coefficient is expected

P1*: The size of board of directors is larger for firms committing cartel than for a matched sample of non-cartel firms*

- **Board Independence (Non-Executive Directors)**

There are two kinds of independent board members thus identified. The first kind is the one who is actually affiliated with the firm and is an employee and the second kind is the one who is not affiliated with the organisation at all and only provides services like consultation etc. (NACD, 1996). These independent directors do not have any kind of financial ties which could hinder their performance in the firm. Much confusion exists about how many independent board of directors should exists since there are many costs involved with it.

In the literature there are two kinds of views present about independent directors. In one hand, some state that the market perceives these directors as more efficient in making corporate decisions which is why they are promoted (Byrd and Hickman 1992; Brickley, *et al*., 1994; Cotter, *et al*.,(1997); Dann, Del Guercio and Partch (2003); Anderson, *et al*.,, 2004).

On the other hand some state that they may not be able to provide such high value (Bahgat and Black, 1999). It also presented by Gillette, Noe, and Rebello (2003) that there needs to be a mix of outside and inside directors and that the inside directors should be provided with incentives. With the help of these incentives it would be possible to bring about truthfulness and integrity within the decision making processes without having to use the concept of veto power. A study has also been conducted which states that the large number of independent directors are able to manage the decision making process efficiently.

The literature also has not been able to clearly state if the inside or outside directors have the ability to influence the kind of conflicts that take place in an organisation (Mace, 1986; Patton and Baker, 1987; Hermalin and Weisbach, 1988, 1991; Lee, *et al.*, 1992; Shivdasani, 1993; Vicknair, *et al.*, 1993). Within the category of outside directors there are two kinds, the grey (non-independent directors/ non-executive directors) and the independent directors. In this case, an independent director is one who is only affiliated with the firm as being a board of director lest he has no kind of affiliation. For the purpose of this research as well the outside non-executive directors would be taken into account.

Many researchers have observed the effect of outside directors on the board and found that it is not only the compensation that can be held responsible for the monitoring constraints of the organisation (Fizel *et al.*, 1990). A labour contract is established with the CEO when he is hired and within this contract exist all constraints for the CEO activities. Some of the findings suggest that the time period of the CEO has no link with the fraction of outsiders on the board. It is found that a monotonic decrease takes place in the time period when the outsiders' percentage of the board is increased.

Moreover, board of directors is considered the most important element in the internal framework of corporate governance (Fama, 1980; Fama and Jensen, 1983). The board's composition serves as the basis for establishing the board with effective management monitoring. The agency theory views that an independent board is a vigilant element of agency problem since it involves a considerable number of non-executive directors tasked to monitor the performance and behaviour of management (Johnson *et al.*, 1996; Bainbridge, 1993).

It is posited that boards with dominance of insider directors tend to have self-monitoring problems as well as weak monitoring stances by executive directors (Fama, 1980). Lawler *et al.* (2002), through their empirical study on the subject, support the view that board independence leads to capacity to improve the board's monitoring function. Moreover, Haniffa and Cooke (2002) posit that aside from the direct impact of board independence on the performance of the firm, it also impacts on financial disclosure since management can be forced by outside directors to enhance firm disclosure quality.

In the UK, the Cadbury Report (Cadbury, 2002) emphasises the significance of independent boards, alongside its recommendation of a minimum of three independent directors on the board to ensure a substantial contribution of independent directors in executing the board's duties. The Higgs Report

on the Corporate Governance Combined Code 2003 which consists of the regulation to include in the annual report the independent non-executive directors. The board has a duty to ascertain board independence in terms of judgment and character, including the circumstances or relationships that tend to create an impact on the director's judgment. Nonetheless, the issue of independence here does not rest on relying totally on the items that firms disclose in their annual reports but that of the directors' independence. The work identifies the application of independence criteria to each non-executive director. Each non-executive director is therefore examined whether each independence criterion is applied to them to find out their independence. Moreover, the director is disqualified from divergence from any of the independence criteria of the UK Corporate Governance Combined Code 2003.

In the appointment of new directors it is more likely for cartel to choose busy outsider directors, and this is congruent with a conjecture that management tends to nominate new board members who are not likely to do aggressive monitoring. This results in models that have controls for board size (Gonzalez, Schmid, and Yermack, 2013).

In a study of Kang, *et al.*, (2007), it is revealed that director independence is demonstrated in 83 firms from the total ones involved in the study. This is consistent with the finding of another study showing 73 firms with independent chairpersons. These findings are congruent with the recommendations made by ASX Corporate Governance Council in 2003. The level of board independence is found to have been significantly influenced by shareholder concentration and industry type as implied by the findings (Kang *et al.*, 2007).

Another research study states that there may be a relationship between the CEO turnover levels and outsider representation (Weisbach, 1988). There is a strong relationship between firm performance and the presence of inside or outside board of directors. Borokhovich *et al.* (1996) found out that outsider board members are supportive of other outsider board members in the activities carried out within the firm and that they are most likely to become the CEO of the organisation depending on their percentage. The market also has confidence in these outsider boards of directors that they would provide benefits as a whole. These outside boards of directors may quit from their position if the firm is not performing well in the organisation which is why the CEO close to his retirement is inclined to hire inside board of directors so that they may be permanent and available to become the next CEO (Hermalin and Weisbach, 2003).

To form an effective and competent board it is necessary to have a number of independent directors (Fama1980; Fama and Jensen, 1983). Fama (1980) and Fama and Jensen (1983) use the terminologies "outside directors" rather than "independent directors". However, their general notion of outside directors is similar to independent directors. According to them, the management of the firm should be comfortable enough to bring their issues to the board without worrying of being questioned or punished (Fama, 1980). Hence, independent directors are helpful in increasing the performance of the firm since the management feels comfortable in applying their expertise.

Some of the research studies also state that internal mechanisms are not required and that the market is able to provide a solution to the agency problem and the board of directors are unnecessary (e.g., Hart, 1983). The market is very much interested in the appointment of outside directors as they believe that these directors would act in the interest of the market (Rosenstein and Wyatt, 1990).

Prior studies indicate that there is a positive impact that independent board members can pose on the governance of a firm, specifically in terms of fraud (Beasley, 1996; Xie *et al.*, 2003; Peasnell *et al.*, 2000a; Peasnell *et al.*, 2005; Jaggi *et al.*, 2009; Klein, 2002b; Chtourou *et al.*, 2001; Bradbury, 2006; and Dimitropoulos and Asteriou 2010).

As mentioned above, board independence is regarded as a very important element in an organisation due to the fact that non-executive directors (outside directors) are considered as the control and monitor mechanism in the firm, who can also enhance firm performance (Duchin *et al.*, 2010; Fama and Jensen, 1983; Weishbach, 1988). Being financially independent from the management, and from possibly conflicting situations, non-executive directors (outside directors) have the ability to minimise agency problems and control managerial self-interests (Rhodes *et al.*, 2000). They are able to protect the shareholder interest, as well as supervise and manage performance in a much better way to align firm strategies for greater performance. Therefore, if cartel agreement can be considered as a failure of corporate control and monitor, i.e. a failure of the board to control and monitor individuals (e.g., CEO, individual directors). Hence, it should be the case that the propensity to get into the cartel agreement is negatively related to the percentage of independent board members on the board. Consistent with most prior studies, board independence (**NED**) is calculated in this study as the percentage of independent NEDs to the total number of board members. Consequently, this study empirically tests the proposition below by controlling for poor firm financial performance, firm

ownership status, current ratio, firm sale, and Herfindahl index. Negative and significant coefficient is expected:

P2: *The percentage of independent (non-executive) members on the board of director is lower for firms committed cartel crime than for non-cartel firms.*

- **Age of the Board of Directors**

Several views have been stated by researchers regarding the age of the board of directors. On one hand, some of them state that as the board members grow older, their productivity levels decline. On the other hand, the older board members are found to have much more experience and a well-integrated social network to enhance the performance of the organisation. According to the National Association of Corporate Directors the age of 70 these board members should be removed so that the productivity levels may be maintained. The compensation paid to these managers is higher than their levels of productivity which is why it is essential to retire them (Core, Holthausen and Larcker, 1999).

Even though this criticism is considered valid, older board members may also prove to be productive. For instance, those directors who have retired can now provide more time and efficiency towards the corporation. If there are younger directors present it is possible that the risk taking may increase and a strategic change may take place (Child, 1974; Wiersema and Bantel, 1992). On the other hand a researcher states that when older directors are present, the processes become more conservative. These managers are more independent than the younger managers who actually carry out risks based on the expense of the shareholders (Stevens *et al.*, 1978). Hence, it is believed that directors who are older in age are able to provide better performance than the ones who are younger.

In a study of Vell (2010) involving the age distribution of board members, they find out that 56 is the average age whilst 58 is the median age of these board members. Age diversity is present as shown by three board members who are aged 71 and some others who are aged 33. In a board index by Silicon Valley in 2008, it was found out that boards tend to trend a little older. Outside directors had an average age 59, compared with 57 in 2007. Alternatively, Lacker and Tayan (2011) stated that firms establishing an age limit to serve on a board have about 72 years as the average mandatory retirement age. Loos (2010) claims that there are typically no age restrictions imposed on directors of

boards of US corporations. Age requirements can however be set by charter documents as a matter of corporate governance policy.

According to Kang and Shivdasani (1995), the generalisability of findings related to age of directors is bounded by different regulatory environments, cultural diversity, size of capital markets, and governance mechanism effectiveness. Hence, the value of governance structures including the age of directors, as well as the influential factors, must be investigated separately in each country.

Ferris, Jagannathan, and Pritchard (2002) found in their study that directors nearing retirement age might consider multiple directorships. Age is said to serve as a proxy for the *director's experience* and the energy needed for the demands of board service. The study finds that the regression for the number of directorships vis-à-vis age involves a significant positive co-efficiency. It also suggests that older directors with greater experience of directorships are no longer interested in additional directorships or might pose as less attractive candidates. The average age of directors is also older in boards with multiple directors. In a particular corporation, arbitrary terms are not held by the board as a limitation that may be imposed on directors' service. The board does not also maintain a position that directors must be remunerated annually until upon reaching the mandatory retirement age (Clayman, Fridson, and Troughton, 2012).

In a study by Kang *et al.* (2007), it is found out that the age of directors tend to become a sensitive area as shown by 70 firms in the sample disclosing this information. There is evidence showing preference by firms for directors in the older age groups, whereby those within the age range of 50 and above comprise 80% of the total sample. There is also a significant and positive link between age diversity and board size, as there is generally a positive link between age diversity and the type of industry in which these directors belong. Moreover, it is found out that a more diverse age range is demonstrated by directors in consumer sectors and product industry sector.

There has not been much a focus on individual differences in risk taking, which also includes its association with age. According to Wiersema and Bantel (1992), when firms bring about various changes in their corporate strategy, it is usually seen that the top management of the firm has a lower average age, which could mean that as age increases risk aversion increases. A negative association between age and risk taking and the importance of risk has been seen through a short version of Kogan and Wallach's choice-dilemma test. This test was conducted by Vroom and Pahl (1971) to

observe 1,484 managers from over 200 firms. When individual marks are correlated with age, the association is small in size, but it increases significantly when mean marks are used. Moreover, the associations across items and across firms are relatively balanced. The developmental and socio cultural mechanisms that could cause these outcomes are discussed.

Campbell (2001) in terms of investment behaviour, reports a negative age impact on engaging in equity investments. Analyzing risk perceptions of households, Bucciol and Miniaci (forthcoming) found that risk tolerance is reduced in age and a review study by Sahm (2007) and Grable, McGill, and Britt (2009) suggests that older individuals are less risk tolerant. Grable, *et al*., (2009) attribute this result to improve in attained knowledge of risk and risky situations comparable to younger people.

Agarwal, Driscoll, Gabaix, and Laibson (2009) harmonize with this literature by examining lifecycle patterns in financial decisions connected to credit behaviour. They document that younger individuals make more mistakes than older people, e.g., they are less capable to value properties and they spend too much high fees. Overconfidence additionally performs a part. Gervais and Odean (2001) suggest inexperience in younger individuals leads to misattribution of success causing in upward revisions of the capability to manage risk. Eventually, individuals better assess their knowledge and risk tolerance reduces.

The investors' portfolio choices have been utilised in various researches to assess willingness of investors to take risk. Personal risk taking in general and more particularly corporate risk taking has been seen to be effected due to age. According to Samanez-Larkin *et al.* (2010), exceptional effects of age on risk taking in financial decision making have been observed. As per the work of Ackert *et al.* (2002), it has been found that investors of an older age keep a smaller percentage of their risky assets in equities as compared to bonds, showing risk aversion increases with age. Even according to Bodie and Crane (1997) and Morin and Suarez (1983), there is a significantly negatively relation between age and percentage of risky assets held in equity.

According to Mason and Hambrick (1984), younger executives take on riskier strategies referring to the 'follies of youth'. This was supported by Markóczy (1997) whose study revealed the greater inclination of young directors to take risks, while it was asserted by Brouthers *et al*. (2000) that

managers in their young age are more 'strategically aggressive' than those who are in their old age and this is especially true during times of instability.

Younger directors are however more likely to face pressures from the society and corporation, as was revealed in a study of white collar crime by Price and Norris (2009). In contrast older directors are protected from these pressures due to their age (Price and Norris, 2009), and they also have a less tendency to give in to these industrial and organization forces (Daboub *et al*., 1995). Older executives are considered to be more conventional which is probably due to their ability of being able to judge risks and negative outcomes. They also have a lesser tendency to challenge the corporation's policies (Child, 1974). Higher degree of moral development creates maturity, and older directors are more capable of adequately comprehending the ethical standards of conduct of the firm (Serwinek, 1992).

The effect of board age on risk-taking is not attributable to changes in risk-taking to board age, but to ownership structure (Berger, *et al.*, 2012). A research contacted by Elsaid (2012), where he studied 679 CEO successions in 650 small, medium and large-cap North American firms, between 1992 and 2005. Elsaid found that corporate risk-taking is influenced by board age, in which a link is indicated between older boards and less firm risk-taking.

In summary, it can be argued that if the board consists of younger directors, it is possible that risk taking may increase and more risky strategies may take place (Wiersema and Bantel (1992), Ackert *et al.* (2002), Bodie and Crane (1997), Morin and Suarez (1983) and Elsaid (2012)). Following Anderson *et al.* (2004) this study measures board age as the sum of all the ages of directors divided by the number of directors. The proposition below is tested by controlling for poor firm financial performance, firm ownership status, current ratio, firm sale, and Herfindahl index. Negative and significant coefficient (AGEBA):

P3: *The average age of board directors for cartel firms is lower than non-cartel firms.*

- **Gender Diversity of the Board**

The corporate board of directors also requires paying attention to gender diversity amongst members. Depending on the kind of society the organisation is associated with, there is usually a homogenous board of directors. This aspect is considered poor implementation of the corporate governance structure since both genders should be provided with equal opportunities (Bilimoria and Piderit,

1994; Burke and Mattis, 2000; Carter *et al.*, 2003; Conyon and Mallin, 1997; Daily and Dalton, 1992; Singh and Vinnicombe, 2004; Singh *et al.*, 2001; Thomas, 2001).

According to Hampel (1998), agency theory supports board gender diversity with the theory's emphasis on board balance. Hence, a more balanced board takes place through representation from diverse groups especially those boards tending to prevent small groups from imposing dominance on decision-making processes.

According to Weber and Zulehner (2010), there are more chances of survival of new start-ups that employ female first. As per Adams and Ferreira (2009), when the board of directors is more gender-diverse, it can be seen that CEO turnover is associated increasingly with poor performance. There was increased acquisitions and decline in performance in Norwegian publicly-traded firms when board member gender quotas were made obligatory (Ahern and Dittmar 2012). All these studies show that gender diversity affects corporate decisions or outcomes.

Shrader *et al.* (1997) suggest that there was no significant link between percentage of women in top management and firm performance, whilst a negative effect on performance of the firm was seen with the inclusion of women as board members. These outcomes were found through a study of Shrader *et al.* (1997), using a sample of 200 large US firms. However, there was a quite a significant relation found between women friendliness and profitability of the firm, by the study of Alder (2001).

Firm performance is positively affected when it has women employees, as has been ascertained through many studies (Hillman *et al*., 1998; Adler, 2001; Erhardt *et al*., 2003; Carter *et al*., 2003; Catalyst, 2007). Firms achieve greater shareholder returns when their boards consist of a greater number of women and minorities as Hillman *et al*. (1998) stated that an increased diversity in the board greatly benefits the shareholders. A similar study by Adler (2001) found that the firm profitability had a strong relationship with the extent of employment of women at senior executive level in the firms of Fortune 500.

Managerial risk-taking may be explained by agency theory, which considers risk preferences in stable mode. It is also supported by behavioural approaches which assume that risk perceptions, and thus risk-taking, are importantly linked and dependent to context. It must be noted however that despite research prevalence of agency theory, there remains an unclear domain on the exact link

between government structure and choice for agent risk (Finkelstein, *et al*., 2009). The study of Berger, Kick, and Shaeck (2012) suggest that higher proportion of female executives leads to board changes. This in turn is related to increased risk taking by younger executives, which also results in board changes. On the contrary, increased executive representation holding PhD degrees as an outcome of board changes leads to decline in risk taking. Berger and colleagues further that an executive board's socio-economic composition has high relevance to socio-economic policy, which is seen in gender quotas that are often used to support career outcomes for females.

However, it is noted that there is little evidence found in the impact of having more females in the board on firm outcomes and whether female board members indeed put forward a less risky posture to conduct business. It is indicated that whilst quotas on an executive's gender have direct impact on the representation of various groups on executive boards, a knock-on effect takes place on corporate outcomes. In the study of Barsky and colleagues (1997 cited in Berger *et al.*, 2012) and Jianakoplos and Bernasek (1998 cited in Berger *et al.*, 2012), it is inferred that female executives tend to be more risk averse in decision making relating to financial concerns.

In a separate study within the context of corporate governance arrangements, it is found out that there is an inverse relationship between female board members and firm risk, whereby it is revealed that it is more likely for female board members to take risks than men (Berger *et al.*, 2012). The analysis points out to the notion that excessive monitoring is taken by female directors, which thereby leads to decreased shareholder value, and that they undertake such poorer investment decisions because of the bigger obstacles they face than men who are able to acquire information on investment projects (Bharat *et al.*, 2009 cited in Berger *et al.*, 2012).

However, Hillman, *et al*. (2002) documented otherwise in the propensity for women to occupy board seats. The authors undertake a study to determine any difference between female directors of racial minority and white males where they use a sample from Fortune 1000 boards. The findings indicate differences in education, occupational backgrounds, and board affiliation patterns, whereby female directors and those with African-American descent tend to come from non-business backgrounds and likewise tend to become more involved in multiple boards faster than their male benchmarks. The issue is the ability of these females to take risk in occupying multiple boards at a faster rate.

Two-hundred large organisations were researched upon and the conclusion showed that women in the higher levels of management hierarchy were irrelevant for firm performance (Shrader *et al.*, 1997).

There were many instances indicating a negative impact of women being on the board. These conclusions were drawn using the measurements of return on equity (ROE), return on sales (ROS), and return on assets (ROA).

Moreover, Nguyen, *et al.* (2007) examines the relationship between the firm's market value and gender diversity of board of directors. The results indicate that shareholders' value tend to be promoted by gender diversity, as there is a significant economic relationship between woman director variables and the firm's higher market value. Similarly, there are significant relationships evidenced from board diversity studies between women proportion on the board and the firm's average value. It must be noted that there tends to be an association between participative boards with equal power distribution between the CEO and the board, and increased proportion of female board members (Pearce and Zahra, 1992).

Research made by Singh and Vinnicombe (2004) nevertheless indicates fewer women compared to men occupying board directorship in UK firms. This is demonstrated by only 64% female directors for the top 100 firms in 1999, which went down to 61% in 2002. It is said that social exclusion may prove as a dominant factor to this occurrence.

In their study of women on corporate board of directors, Dang and Vo (2012) indicate that a glacially slow progress in gaining seats on boards of directors is experienced by female candidates. This is explained by the barriers hindering women's progress and issues relating to the influence of women directors on firm performance.

Another study also shows a positive relationship between firm value and gender or minority diversity amongst the board of directors (Carter *et al.* 2003). Using Tobin's Q proxies, it is possible to believe that women and minorities on the board can help increase the value of the firm. This aspect was suggested after conducting an experiment on a sample of 638 Fortune 1000 organisations. The same research study indicated that the proportion of women on the board is higher than that of the minorities present. However, it was not able to define the effect of women participation on firm performance.

Jamali *et al.* (2007) claim that female board member's gain from the firms' governance by means of a range of skills and perspectives and by bringing new dynamics to board deliberations. Background and qualification diversity may enable women to take on unique and rare perspectives during board

meetings and thus contribute to the dynamics of board deliberations. This complements the skills held by male directors who tend to specialise in operations, and other functional areas (Zelechowski and Bilimoria, 2004). Women, on the other hand, are said to possess a range of experiences that are good for governance (Huse and Solberg, 2006). They also tend to query conventional wisdom and lead open discussions, which hence improve boardroom effectiveness and financial reporting quality (Mattis, 2000).

Several previous researches report a positive effect of the role of women on boards and find that women improve the quality of decision making (Smith *et al.*, 2006; Huse & Solberg, 2006), that gender is a factor in ethical decision making (Ford and Richardson, 1994); and that women are generally more risk averse than men (Watson and McNaughton, 2007).

Thus, a number of studies related to gender diversity led to the fact that gender does greatly impact the risk-taking behaviour of people. Many other studies conducted using different factors like experience, attitude etc. prove that women are less corrupt than men (e.g. Cheung and Hernandez-Julian, 2006; Swamy, Azfar, Knack *et al.*, 1999). They are likely to be much less selfish and are worried about the risks associated with corruption. Barsky and colleagues (1997 cited in Berger *et al.*, 2012) and Jianakoplos and Bernasek (1998 cited in Berger *et al.*, 2012), documented that female executives tend to be more risk averse in decision making relating to financial concerns. Therefore, in this study we expected to see less female directors serving on the board of cartel firms than non-cartel firms. Following Tacheva and Huse (2006) this study measures gender diversity (GENBA %) by the percentage of female directors on the board of directors. Controlling for firm ownership status, current ratio, firm sale, and Herfindahl index, a negative and significant coefficient is expected (GENBA %).

P4: *There are less female directors on the board of cartel firms than the non-cartel firms.*

- **Duration of the Board of Directors**

The behaviour of a director based on his tenure in the organisation is confusing to define. Many directors have been found to have high levels of commitment, skills, knowledge, and expertise due to their experience in the business environment for many years. The organisation is highly influenced by executive and outside directors depending on their time duration within the organisation. These managers are highly associated with the firm's resources and have the ability to decide which

decision would help enhance the performance of the organisation. Familiarity with the organisation can itself provide many benefits (French and Raven, 1959; Zald, 1969).

Hence, it is believed that the tenure of these members would highly influence the organisation as a whole. Many other researchers also indicate that when the length of service of the participant increases, a cohort group is established with the rest of the members, where mutual decision-making processes are carried out in the organisation. They may also carry out activities like competition or rivalry to grow faster (Pfeffer, 1982). These cohorts have the ability to reflect power distribution and influence within the firm. Socialisation levels are very high for members who are of long duration within the firm.

Alderfer (2004) conducted a study that thoroughly analysed the decision making processes of the board members in an organisation. He stated that when these members are of long tenure, they form a special group with comfortable understanding of each other and operate the organisation efficiently. When new board members are introduced, these new members are required to study the practices of the organisation in order to carry out effective decisions and this may take a few years.

In shared firms, the duration of the board of directors may not exceed four years and may be re-elected according to the constitutive documents (Sitaru, 2011). Usually, the general meeting of shareholders appoint the directors of the board for a four-year term, which is also subject to renewability.

The board's duration of office must be defined in order for all directors not to rotate off the board at the same period. This is done by appointing one-third of the new board members for a term of two years; another one-third for a term of three years and yet another for a term of four years. This must take place until the natural rotation of the board is established, and hence preserve its stability (Tagg, 2013).

Garoyan and Mohn (1985), state that the long duration of the board is beneficial. Proprietary corporations usually elect directors to a one-year unrestricted succession of terms. Directors must be permitted to have duration of enough consecutive terms so that they may acquire a thorough understanding of operations; thus, the authors suggest three three-year terms for the board's duration.

A study by Buchanan (1974) suggests that the commitment and motivation of a firm to strive harder to achieve its goals increases when the tenure of directors is extended. This is supported by Salancik (1977) who asserts that experienced employees have gained sufficient confidence and expertise in carrying out their tasks and also have an additional stake in the organization (like the ownership of firm stock) which is why tenure directly affects organizational commitment.

Vance (1983) suggests that the talent and expertise of directors is wasted when they are forced to retire. Hence, when there is an efficient market for directors, shareholder interests are best secured through the long term survival of directors.

Katz (1982) obtains contrasting results which state that intra-group communication decreases when tenure is increased and also leads to the isolation of groups from important sources of information. There is a non-linear relationship between group performance and tenure as ascertained in his study, with performance increasing initially due to learning effect, and falling subsequently. The lengthy presence of the directors on the corporate boards has led to the business community's apprehensions regarding its unfavourable effect on shareholders.

Replacing directors is considered to be a key challenge, however alterations to the composition of the board is necessary due to changing business climate, as has been underlined by NACD (1996). The board directors are allowed to provide their service for a maximum of 10 to 15 years according to the Commission so that the creative ideas and analytical thinking of new directors can be utilized by the board. There might be an attempt by the influential directors to take over some of the responsibilities of the CEO with time, which is why Lipton and Lorsch (1992) have proposed having limits on the director's term.

The quality of longer board duration has been discussed in the previous literature (Buchanan (1974); Garoyan and Mohn (1985); Alderfer (2004); and Pfeffer (1982)). Vance's (1983) claim that boards of longer duration are generally interested in achieving the goals of the organisation. However, none of the previous research has examined the relationship between board duration and infringement behaviours particularly in relation to cartel formation. Therefore, this study assumes that the quality of the longer board duration exist in non-cartel firms, thus will empirically examine the relationship between board duration and cartel formation (DURBA) by controlling for firm poor financial

performance, firm ownership status, current ratio, firm sale, and Herfindahl index. A negative and significant coefficient is expected.

P5: *The average duration of the cartel board is less than non-cartel firms*

- **Remuneration**

Many researches are found on organisational performance and board composition but there is only limited research available on corporate fraud and board compensation. The Agency Problem has been defined as a modern issue which is associated with managerial power and discretion since these managers may use the discretion for personal gain (Shleifer and Vishny, 1997; Jensen and Meckling, 1976). These managers may not consider that the organisation is not performing well and still distribute the excess cash that is available (Jensen, 1974; Williamson, 1964; Jensen, 1986). They may also stabilise themselves in such positions that it becomes difficult for the organisation to remove them when the time comes (Shleifer and Vishny; 1989).

By adjusting the pay of these directors it is believed that the agency problem may be avoided temporarily. The compensation scheme needs to be strong so that the board is motivated to achieve the goals of the organisation as well as pursue their own interests. To understand which kind of compensation package is best suited in an organisation many financial economists have conducted thorough research. To achieve an optimal contracting model, Murphy (1986) as well as Core, *et al.*, (2001) has made several efforts. The only limitation that lies in the study in the package deals with political aspects which are associated with deciding on the most suitable compensation package for the directors (Jensen and Murphy, 1990).

A study has been conducted to find out whether the compensation provided to the board of directors in the form of cash is able to enhance the performance of the organisation and is negatively associated with the performance of the peer groups present in the same industry (Gibbons and Murphy, 1990). Using the data from 1974 to 1986 on 1,049 US firms, it was found that cash compensation is able to decrease the market average stock return but is able to increase the firm's stock returns. When peer groups were considered, there was a significant and positive relationship with the return on assets.

Firms have acknowledged the idea of managerial discretion as an important determinant of CEO compensation; however, there is no existing test thus conducted to formally examine the discretion hypothesis despite considerable work that indirectly invoked certain ideas relating to the sources of possible managerial contribution (Finkelstein and Boyd, 1998). The performance consequences of CEO remuneration had been tested only by little attention. Finkelstein and Boyd make use of samples from Fortune 1,000 firms where they find evidence for a principal impact of managerial discretion on CEO remuneration as well as a contingency effect that shows higher firm performance with aligned discretion and remuneration than when such alignment is absent.

The shareholders are unable to monitor the activities of the executives entirely which is why they develop compensation contracts to motivate them to perform well. In some cases it is found that these executives may resort to corruption practices in the financial statements to help receive their compensations. They are only interested in achieving the goals set for the organisation for personal gain. Researchers like Bar-Gill and Bebchuk (2003a, 2003b), Goldman and Slezak (2003), Robison and Santore (2006), and Chesney and Gibson-Asner (2004) have worked towards the development of models for efficient incentives which do not create corruption practices since financial incentives have the best ability to develop corruption in the organisation (Becker, 1968).

Consequently, this study empirically tests the proposition below by controlling for poor firm financial performance, firm ownership status, current ratio, firm sale, and Herfindahl index. Similar to findings by Bar-Gill and Bebchuk (2003a, 2003b), Goldman and Slezak (2003), Robison and Santore (2004), and Chesney and Gibson-Asner (2004), this study expects to see a positive and significant coefficient between board remuneration and cartel formation.

P6: *The board remuneration for cartel firms is higher than non-cartel firms.*

3.6.2 Does Ownership Structure Matter?

- **Outside Directors' Stock Ownership**

The ownership structure of the board of directors has the ability to influence the corruption practices taking place in the organisation. This effect has been thoroughly analysed by authors - Hermalin and Weisbach (1988), Morck, Shleifer, and Vishny (1988) - who believe that there is a strong relationship

between the ownership structure and corruption practices. Several researchers have also examined the institutional and insider ownership within an organisation by taking into account long term returns and applying regression analysis. This research states that as ownership increases the stock levels also increase (Han and Suk, 1998). It is also found out that insider ownership may negatively affect the performance of the organisation since there is a possibility of management entrenchment.

Core, Holthausen, and Larcker (1999) indicate in their study that a considerable amount of CEO compensation's cross-sectional discrepancy may be explained by board measures and ownership structures. In addition, the study suggests that CEOs receive bigger compensation when they are within less effective governance structures. Overall, the authors' results indicate that greater agency problems are encountered by firms that have weaker governance structures and that these firms perform worse. They also find out that CEOs of these firms receive greater compensation.

Peng (2004), points out whether outside corporate board directors have an effect on firm performance during institutional change. The authors use resource dependence and institutional theories in addressing this concern. Their findings demonstrate that there is indeed a difference made by outside directors on firm performance, specifically when sales growth is used as a measure for such performance. A bandwagon effect is also exhibited by the results and such effect relates to the practice of outside director appointment to corporate boards. The study highlights the policy implications of the trend towards appointing more outside directors in corporate boards. According to Hermalin and Weisbach (2003), changes in ownership structure, along with CEO turnover, is an important factor affecting changes in boards.

The US public corporations data which bear Federal crimes taking place in 1984-1990 are also analysed by Alexander and Cohen (1999). With the help of these data, it is possible to provide fresh Federal guidelines for the sentencing of the organisation. The analysis of the data shows that when there is a large ownership stake, corruption practices are at low levels in the organisation.

There are circumstances that it is not possible to change the board size by changing the ownership structure (Chen and Yao, 2006). Moreover, it is very rare that a firm separates ownership and control in its structure since it is a frequent occurrence that controllers possess some degree of ownership of the firms' equity. Corporate governance holds that ownership structure is a potentially important element. Keasey, Thompson, and Wright (2005) hold that reduced conflicts of interest and higher firm value must be the result of great overlap between ownership and control. They further that

alignment of managers' interests with those of the firm's shareholders is the result of ownership by management.

In a study involving CEOs, ownership structure and the relationship between CEO and the board are explored in relation to their impact on pay and performance. For ownership structure, the result is that institutional investors have limits on paying CEO with unearned compensation. Evidence shows that more benefits can be obtained by boards by acquiring impartial outside directors than by increasing the number of outside directors (Mangel and Singh, 1993).

It is predicted that the greater the stock ownership of outside directors, the smaller the incentive to indulge in managing fraud and hence, the smaller the possibility of cartel formation. Thus, the proposition below is empirically tested (OUTOWN %), representing the percentage of common stock owned by outside directors. Controlling for poor firm financial performance, firm ownership status, current ratio, firm sale, and Herfindahl index, a negative and significant coefficient is expected.

P7: *The percentage of outside directors' stock ownership is lower for cartel firms than for non- cartel firms*

- **Family-Owned and Controlled Firms**

The notion behind family-controlled firms will be discussed under this segment. As Astrachan and Shanker (2003) define, family-controlled firms are organizations which are formed either under close associations or within the related members of the family each contributing as an investor which grants them the voting right to make key decisions for the firm. Such family firms provide benefit in terms of alleviating the Type I agency problem, phenomena commonly experienced under the conventional owner-manager setup which occur due to conflicting interests (Demsetz and Lehn, 1985; Anderson and Reeb, 2003, 2004; Villalonga and Amit, 2006). Hence, we can simply say that firms which are founded and run by family members come under the domain of family firms.

There are several reasons as to how such family-controlled firms actually decrease the probability of agency conflict. Ali *et al*., (2007) ascertain that firstly, because the individual capital share of each family member is involved in the business, it is ensured that the business activities of the manager are thoroughly scrutinised. In contrast, individual shareholders in a firm find it difficult to monitor managerial activities because of their diversified portfolios. Secondly, family members have a good

background of their business and are genuinely concerned about it giving them a better chance to keep a check on managers. Thirdly, all family firms are ready to provide for investment even in the long run as compared to shareholders. This automatically makes them wary of any prejudiced decisions made by managers.

The above mentioned characteristics can, on one hand, prove to be advantageous for managers as they allow them with considerable authority to engage in either managerial entrenchment (Shleifer and Vishny, 1997) or other related- party transactions (Anderson and Reeb, 2003) by diverting private benefits at the cost of shareholders. However, on the other hand, such characteristics make it very difficult for them to perform earnings management to hide any opportunistic behaviour which can harm other shareholders.

The structure of family firms comprises of a larger shareholder who can either be an individual or an institution like for example, financial intermediaries, investment fund or a corporation. This structure will define the type of agency problem which might originate. The inducement for expropriation and monitoring increases, if the larger shareholder is either a family or an individual, thus leading to agency problem II. In such a case, the family will utilize its power to gain private benefits at the cost of other minority shareholders. However, if the larger shareholder is an institution, then the authority to control is spread amongst various shareholders where each of them has lesser advantage to expropriate smaller shareholder. But at the same time, it commands greater check on the manager leading to agency problem I.

Prior researches state that at times, decisions favouring the majority shareholders are made in family firms which might actually differ from the interest of the smaller shareholder (Morck and Yeung, (2003); and Bertrand and Schoar, (2006)). As Perez-Gonzalez (2006) state that in case the larger shareholder is the family, members attach significance to control and will try to be part of the management even though it may cause weak firm operations.

Making a distinct comparison between family and non family firms, it is observed that non family firms typically face Type I agency problems. To tackle with them, managers in non family firms are compensated on observable performance measures. Conversely, managers in family firms are not often compensated under observable performance measures. This is because the founders have a direct control and will keep a check on the management; hence compensate the manager on the basis

of his actual efforts which are visible under the controlling process. Chen (2005) provides reasoning on compensation of CEO which is related to the fact that the issues arising from separation of management and ownership are quite narrow in family firms. He states that a CEO's earning based pay for family firm is quite less in terms of total and also as a percentage of total compensation. Healy and Palepu (2001) and Fields, Lys and Vincent (2001) report less probability of earnings to be manoeuvred in family firms as management compensation is not linked with earnings.

Members of family have a clear understanding on the operations of the business which is why the manager will have a minimalistic chance to engage in any behaviour which can impact the firm's profitability. Ali *et al*., (2007) quote an instance whereby direct control by the family over the manager and their long term association with suppliers and customers will allow them to identify if sales revenue is overstated due to early procurement of goods or unfounded reduction has been made to allow for flexible payments.

It is hence established that due to Type I agency problems, quality of reported income for family firms is much greater than those of non family ones. Nevertheless, aspects of reputation concern in the labour market and legal liabilities can assist in alleviating if not completely eradicating these discrepancies between non family and family firms. Ali *et al.,* (2007) hence imply that in comparison to non family firms, family firms will deliver better quality of reported earnings.

Type II agency problems have their share of differences and can cause a differential effect on the quality of reported earnings amongst both family and non family firms. Such problems may direct family firms towards manoeuvring of accounting earnings for various reasons such as to conceal the unfavourable impact of a related party transaction or to assist family members in gaining management positions. Because the owners in family firms have the adequate authority and control, they are definitely capable of manoeuvring the earnings. Such private seeking behaviour on the cost of minority shareholders can cause legal liabilities and a decrease in stock price of the firm, which help to lessen the difference in Type II agency problems amongst non- family and family firms. As the case with Type I, these aspects will only alleviate the difference in Type II agency Problems between family and no-family firms but not eradicate then completely. The quality of earnings in family firms is therefore expected to deteriorate as Ali *et al*., (2007) state keeping in view their exposure to greater Type II agency problems as compared to non-family firms.

The influence of family control and institutional investors on the remuneration received by CEO has been studied by Ettore, *et al*., (2012). To analyse the effect, 754 listed firms with 3731 firm-year observations across 14 different countries from Continental Europe were studied from year 2001 to 2008. It was found that in family business, adequate control will help to curtail the amount of both total cash and part of equity based remuneration for the CEOs. However, any influential impact of family control on surplus total and cash compensation was found to be missing. Also, the relationship between family control firms and cartels resulting in collusive behaviours has not been established under empirical evidence.

Researchers have argued on the best possible structure for organizations. While McConnaughy, *et al*., (1998); Palia and Ravid (2002); Anderson and Reeb (2003); Adams *et al*., (2004); Fahlenbrach (2005); Villalonga and Amit (2006) suggest founder CEOs to produce constructive results on firm's performance, Anderson and Reeb (2003) state that in the USA, the most successful organizational structure work under family ownership. Specifically if the decision making at the top is under ancestors, control under family firms will be prone to particular limitations (Villalonga and Amit, 2004).

To establish a link between the ownership structure and firm's performance, 675 listed firms across 11 countries of Continental Europe were studied by Barontini and Caprio (2006). The result of the study actually went against the hypothesis of family control hindering the performance of the firm. It reported that family firms will depict better operational performance and valuation if the descendants serve as non-executive directors in the Board. Furthermore, with respect to valuation and performance, such family firms are statistically not discernible from non family firms, if the successor becomes the CEO. In fact family firms are capable to display greater separation between control and rights to cash flow.

Geographically, family firms are expected to perform efficiently in markets which are well regulated and transparent as quoted by Anderson and Reeb (2003) which is why such structure will for example not work in Asian markets and is best suited for large family firms in the US. Their result is based on a study which considers a sample of big US family owned firms whereby it was established that family ownership leads to efficient performance.

To summarize, in family-owned and controlled firms, agency problems I become less relevant, while Type II agency problems appear. Given the fact that the two effects move in opposite directions, the relationship, in terms of cartel formation, is not certain (i.e., it may increase or decrease). However, the focal interest of this part of the study is on the Type II agency problems which demonstrate the conflict between family-controlled firms (large shareholders) and minority shareholder. The definition used in this study of a family firm is very close to the one used by Amit and Villalonga (2006). A firm is reported as a family firm when the founder or a member of the founder's family is a blockholder of the firm. Following Ali, *et al*., (2007); Morck and Yeung, (2003); and Bertrand and Schoar, (2006), who documented that large shareholders (family firms), might use their controlling position in the firm to obtain private gain which might actually differ from the interest of the smaller shareholder. Therefore, the proposition below is tested by controlling for poor firm financial performance, firm ownership status, current ratio, firm sale, and Herfindahl index, to test if cartel is more likely to be formed by family firms (large shareholders). Positive coefficient is expected:

P8*: Cartel likely to be formed by family-owned and controlled firms (large shareholders).*

3.6.3 Does CEO Characteristics Matter?

Anti-cartel enforcement has always been the main concern of the Antitrust Division. The Antitrust Division has always supported the idea of rigorous imprisonment to avoid price fixing, bid rigging, and allocation agreements, which are considered extreme cartel activities. Imprisonment is very necessary in anti-cartel enforcement. Cartel offences are commonly carried out through single employees. Large amount of fines are preferred to be paid by executives to reduce their time in jail rather than being in jail to reduce their fines (U.S Department of Justice, 1993).

As discussed earlier in Chapter Two, the new movement toward punishing individuals (CEOs) who participate in cartel formation means that they are a very important part of the cartel agreement. Therefore, this study examines the link between cartel formation and individuals who are selected as CEOs or executive. Given that a CEO's background experiences will likely impact organisational outcomes, pre-succession experience should be an important differentiating factor in CEO selection. We define 'experience' to include life experience (age) and firm experience (tenure). These managerial characteristics represent individual background factors proposed by Hambrick and Mason (1984) as having important implications for leadership decision making and behaviour.

- **CEO age**

Numerous researches suggest that risk taking reduces with an individual's age. Prendergast and Stole (1996) and Graham (1999) propose theories focused on career considerations. These theories recommend that reputational considerations increase in age.

The managerial signalling model was formed by Prendergast and Stole (1996), the likelihood that younger CEOs make increased and more risky investments than their older CEOs is developed through this model. Younger CEOs go for a more aggressive investment style as compared to older CEOs. According to Prendergast and Stole (1996), younger CEOs try to give implications to the market that they have greater capabilities and so they go for more aggressive investment style. Another point is that to avoid any such indication that their investments made earlier on were not right, older CEOs avoid making any new investment changes. There is a horizon problem in which older CEOs will avoid any new long-term investment projects that could be beneficial to the firm for short-term projects, which may give temporary increase in firm performance. Older CEOs take this step when they are close to their retirement. This horizon problem is linked to the likelihood made by managerial signalling models (e.g. Smith and Watts (1982); Dechow and Sloan (1991); Cheng (2004); Antia, Pantzalis, and Park (2010). However, horizon problem does not explain if this difference in level of riskiness of investments is between older and younger CEOs; it only relates to the issue that older CEOs reduce their investment when they are close to retirement.

Moreover, younger directors and CEOs tend to be less averse and may lack adequate experience, which might impact negatively on the monitoring and control of the firm. Age diversity can build a well-balanced functioning of the board, although more focus must be given to their qualifications, experience, knowledge, and effectiveness (Rezaee, 2007).

In addition, there are entrenched CEOs who invest less and even make less aggressive investment decisions, as found in previous studies. They prefer a *quiet life* (e.g. Amihud and Lev, 1981; Shleifer and Vishny, 1989; Gompers, Ishii, and Metrick, 2003; Bertrand and Mullainathan, 2003). Older CEOs could go for lesser investment levels in comparison to younger CEOS if they have more influence in the firm. Another study is that younger managers have more confidence about the decisions they make and are thus more willing to take risks. Roberts *et al* (2005) as well as Taylor (1975) voice their concerns on reduced energy levels in the elderly. There was also a study showing the causes of how the age of CEO could influence investment behaviour, such as that of Levi, Li, and

Zhang (2010). Levi and colleagues' study shows that in terms of mergers and acquisitions, younger CEOs tend to be more aggressive than older CEOs. Thus, these current studies show that besides risk-aversion, there are other characteristics of CEOs that cause reduced investment in relation to their age.

In the research of Li, Low, and Makhija (2011), the variations in the investment behaviour amongst younger and older CEOs have been investigated. When compared to younger CEOs, older CEOs have a lesser aggressive style of investment. This result was found through the assessment of plant-level investment decisions. A study conducted by Yim (2010) indicates that it is more possible that younger CEOS would go for acquisitions quite early in their careers since there increased remunerations for CEOs take place after an acquisition. Both Li *et al.* and Yim have apparently focused on investigating the link between firm level investment and CEO age.

In contrast, Holmstrom (1999) and Scharfstein and Stein (1990) formed market learning models which provide the likelihood that younger CEOs invest less aggressively than older CEOs since they are more risk averse. According to these researches, younger CEOs are able to face increased inspection from the labour market because they do not have any previous records of investment achievements. This is why younger CEOs are not too keen to go for an aggressive investment strategy because they could face increased inspection from the market if they make any bad investment and that could decrease their future career opportunities. Both these researches have opposing views about the effect on investment decision through the age of executives.

In addition, it has been suggested that the age of the CEO plays a vital role in generating income, but not much has been shown for the link between CEO age and corporate fraud. Studies by Barro and Barro (1990) show how CEO age may result in generation of income by keeping the retirement age at 52 years. The retirement practices are higher when the age is above 52 years and lower when less than 52. Hence, after the retirement age, an individual has little prospects of continuing his position as CEO. However, in cases where CEOs execute extraordinary work, they are less likely to retire during their age of retirement.

Kensinger stated that to consider the merits of the CEOs' stock ownership against option-like compensation needs to take into account their age and decision-making since they respond in a different way based on their life stages (Kensinger, 2012). In the work of Sharma (2011), it was

found that younger CEOs tend to undertake riskier strategies than their older counterparts. Kensinger stated that age plays an important function in the optimal level of employee ownership. Since the time horizon of older CEOs is shorter than that of younger CEOs and since the former cannot rely on legislation to iron their investment performance over time, they are more risk averse compared to younger CEOs. Hence, older CEOs can be described as less fearful and less acquisitive than younger CEOs, which then allow them to respond differently to incentives. This might explain the reason why it is often that boards of directors tend to appoint a younger CEO to lead the functional areas of the firms. This way, the firm benefits from age and experience as well as from enhanced effectiveness of incentives of younger CEOs (Kensinger, 2012).

In a study of MacCrimmon and Wehrung (1990), it was emphasised that the more successful a CEO is, the more likely it is for him to take risks, and the more mature he is, the more he intends to avoid risks. Relating this to the assertion of Kensinger (2012) where the author found that younger CEOs are given the tasks to lead the functional areas of the firm, such position would likely allow CEOs to become successful, or is in fact the basis for their being foreseen to succeed, which is the reason for their appointment in the first place, and which hence relates to MacCrimmon and Wehrung's findings towards being successful. Moreover, as it is a general knowledge that maturity comes with age, this therefore suggests risk aversion amongst older CEOs.

This propensity of younger CEOs towards risk-taking than older ones is supported by the work of Jones (2009). Younger CEOs are more willing to undertake greater strategic change and are more prone to risk-taking. Apart from this, their skill set is more updated due to their acquisition of recent technical knowledge than their older counterparts.

The risk-taking propensity of CEOs based on age is also highlighted in the work of Berger, Kick, and Shaeck (2012) where the authors claimed that the risk-taking stances of financial institutions are influenced by age, education, and gender composition of executive teams. They found out that younger CEO teams tend to have increased risk-taking, as do board changes, leading to a higher proportion of female executives. The authors' initial enquiry was how risk-taking affects the age composition of the CEO board. Empirical evidence demonstrates that risk-taking tends to decrease with CEO's age. It was also found out that risk tolerance is likely to decline with age; hence, older executives are less risk- tolerant than their younger counterparts. Grable *et al.* (2009, cited in Berger *et al.*, 2012) attributed this finding to older CEO's growth in attained knowledge of risk and risky

situations associated with young people. It was also pointed out that younger individual inexperience leads to misattribution of success that hence results in upward revisions of one's ability to control risk. Over time, however, people are more able to assess their abilities, leading to reduction in their risk tolerance. In addition, research suggests that mature CEOs take lesser risk than non-mature ones (Berger *et al.*, 2012).

Consistent with the findings of earlier authors cited in this review, Serfling (2012) found that risk-taking behaviours tends to decrease as the CEO becomes older, and such reduction of firm risk is usually demonstrated by carrying out less risky investment policies. In particular, older CEOs are less likely to invest in research and development compared to their young counterparts. They also found out that when the CEO and the next dominant executive are older, the riskiness of corporate policies tends to be at their lowest. This is contrary to the situation with younger CEO and the next dominant executive, where the riskiness of corporate policies tends to be at their highest. Lastly, the authors determined that less risky firms tend to purposely employ older CEOs, and more risky ones employ younger CEOs to bring into line CEOs' propensity for risk and the risk preferences of the firm (Serfling, 2012).

However, younger CEOs have more to lose in case of dismissal due to poor performance, and they are also more likely to be dismissed by the board than their older counterparts (Kensinger, 2012). Rezaee (2007) also pointed out that younger CEOs may not possess the adequate experience and reputation enjoyed by older CEOs, which might impact negatively on the firm's monitoring and control mechanisms. In the departing directors of S&P 500 firms in 2005, 90 percent of the firms cited retirement as the reason for CEO departures, suggesting that these CEOs have reached their retirement ages when they left their positions. It was pointed out that the general consensus amongst firms in terms of age of the CEO and directors is that firms must establish mandatory retirement ages and term limits for their position.

It was also emphasised in one study that 91 percent of audit committee members, who were independent directors, were 50 years old and older (Baker and Anderson, 2010). This majority composition suggests that firms tend to employ older directors than younger ones.

Moreover, experience is correlated with age, and firms tend to look at young executives as having not established adequate experience and equipped decision-making capability as do older ones (Hart, 1995).

The prevalence of older CEOs in firms is exemplified by the findings of Young and Buchholtz (2002). The authors indicated that the average CEO age in their sample was 58, with the youngest CEO aged only 28. This reveals that since 58 years old is the average age of the CEOs in these firms, it therefore implies that firms generally employ more CEOs who are older than younger ones. Having established this, the risk-taking factor of younger CEOs, although significant, cannot therefore be taken as sole determinant for firms to altogether discount the experience and knowledge of older CEOs.

The age of the CEO has not been linked to the probability of impaired judgement in any of the studies found. However, there exists a strong correlation between wisdom and age with that of making decisions in personal or professional life. This fact has been highlighted by cognitive and development psychologists who studied the relationship of age and competency levels.

Older CEOs are likely to be more conservative and this has a positive impact on firm performance, but also less likelihood of fraud (and increased CEO tenure means less fraud) (Stevens *et al.,* 1978). However, fraud happens amongst single firms – it is a singular activity by one firm, where cartel formation on the other hand has different and more social dynamics. Older CEOs may have strong established social networks that enable the communication necessary to cartel formation compare to younger CEOs. Older CEOs may have worked for many organisations and established a number of strong networks. As a result, engaging in collusion with other firms will be less difficult (Beasley, 1996). Older CEOs established in certain industries can also understand how those market structures perhaps make the formation of a cartel agreement a 'rational decision'. Therefore, the proposition below is tested by controlling for poor firm financial performance, firm ownership status, current ratio, firm sale, and Herfindahl index. Positive coefficient is expected:

P9: *The age of CEO for cartel firms is higher than non-cartel firms*

- **CEO Tenure**

Using the tenure of a manager to monitor the activities of the firm can prove to be efficient as stated in the literature (Weisbach, 1988). This literature states that organisational performance and

managerial turnover have a negative relationship and that the resignation of a CEO also affected the accounting performance and stock returns negatively (Weisbach, 1988). A study states that there is a negative and significant effect of abnormal returns on the change of CEO. This result has been provided by Coughlan and Schmidt (1985) who analysed the fluctuation effect in abnormal stock returns on the probability of the change of CEO.

In a particular study by Barro and Barro (1990), top management levels such as the CEO and the head or chairman of the board were linked to the stock returns of the organisation (Warner, Watts, and Wruck, 1998). The results demonstrate a positive relationship between two aspects; however this is only significant when there is a really good or a really bad performance. CEO pay and turnover have also been analysed by Barro and Barro (1990) by taking into account CEOs in commercial banks from 1982 to 1987. The relationship between firm performance and CEO departure has been analysed using logit regressions. Results show a negative relationship, alongside a significant and improved performance that can reduce turnover levels.

One single individual has been held responsible for the operating and financial decisions being carried out in corruption practices. This is found by analysing fraud cases, where 75% of the cases provide similar results (Loebbecke *et al.*, 1989). With this condition, the management conducts corruption activities but with the help of two variables CEOTENURE and BOSS it would be possible to carry out the monitoring processes. The established CEO has the highest power to monitor the corruption practices being carried out by any of the board of directors (Mace, 1986; Patton and Baker, 1987; Vancil, 1987; Hermalin and Weisbach, 1988).

Rajagopalan and Datta (1996) examine the link between the characteristics of CEO and comprehensive industry conditions using data from manufacturing firms in the United States. The results indicate that a limited role is played by industry conditions in tackling differences in CEO tenure, educational background, and functional heterogeneity. Regression analysis results suggest that there are generally small differences between the two groups' industry coefficients albeit alignment is shown between high performers and CEO characteristics.

Besides, in contrast to the conventional wisdom, short-term contracts with fixed salary mechanisms weakly enhance the cartel stability. Gillian, *et al*., (2009) found that the median and mean duration in a sample of 184 S&P 500 CEO contracts is 3.4 and 3.0 years, respectively. Likewise, as a result of

375 CEO employment contracts of large public corporations, Schwab and Thomas (2006) found that 81% specify duration of 5 years or less, with a mean of 3.6 years.

Furthermore, a study by Jenter and Lewellen (2010) shows that CEO turnover decisions are extremely sensitive to stock price performance. Using a sample of 2,569 publicly traded U.S. firms from 1992 to 2005, the authors found that 44% of CEOs left the firm within 4 years as a consequence of bad firm performance. These empirical results illustrate that executives usually have a short-term renewable employment contract, that is, a contract for a fixed period of time which is renewed if and only if the firm performs adequately well.

Moreover, a study by Han (2010) examines short-term and long-term employment contracts and their effects on cartel stability. The study shows that firms are more likely to be involved in cartel agreement when CEO tenure (short-term employment contract) is low or when CEO turnover is high. Han shows that a short-term contract provides stability to a cartel formation more than a long-term contract. If a certain profit margin is achieved, only then is the short-term contract renewed. With the help of this activity, firm performance is enhanced and defection from the collusion has taken place, which diminishes the chances of being laid off. Firm performance may be hindered due to any kind of future punishment potentials which is why the chance of being laid off increases. The stability of cartel is influenced by these re-employment trade-offs which are tangled with the monetary trade-offs. A long-term contract does not affect stability when the fixed salary components are applied. The fixed components affect the short-term contract to an extent. Cyclical collusive pricing also takes place due to the short-term renewable contracts that may be extended after a certain period of time. It is also observed that equity-financed firms are not able to provide as much stability to cartels as much as debt financed firms.

CEO turnover was the emphasis of the study of Kaplan and Minton (2008) for large U.S firms, serving as samples from 1992 to 2005. Their initial finding was that CEO tenure declined, indicating the precariousness of the job compared to the past years. When the authors included the external takeovers, a decline in the average CEO tenure was found, that was less than six years for the period of 1998 to 2005. Compared to those reported in previous research, substantially shorter tenures have been reported recently. For individual CEOs, some of the benefits of increased pay over this period were likely offset by the shorter expected tenure. It was also found out that it is possible for CEOs with shorter tenure to pursue manipulation in the form of earnings management with the situation that provides greater stock performance sensitivity and higher compensation. Sharma (2011) noted that

long CEO tenure is linked to performance conformity whilst short tenure is associated with the propensity to make strategic change. He also found out that CEO age is positively related to the CEO's tenure with the firm.

Compensation is said to be affected by CEO tenure since there is a tendency for CEOs with longer tenure to earn more than those with shorter tenure. Additionally, older CEOs tend to earn more than their young counterparts. It is also more likely for those with stock ownership to make more than those without. Beasley (2012) found out that the more increased connection the CEO has with the firm's directors; the weaker the governance structure tends to become (Beasley, 2012). Executive compensation can therefore be described as a complex system because of its link to risk-taking and corporate governance (Beasley, 2012).

Beasley, (1996) conducted another logit analysis between fraud and non-fraud firms, using CEO tenure as an independent variable (Beasley, 1996). The basis of Beasley's study is much closer to the study conducted here, and in fact Beasley's study used similar variables CEO tenure and overlap of the CEO and board chair roles **(BOSS)** in the logit analysis. The variable **BOSS** was also found to be positively correlated with the likelihood of financial fraud misstatements. The finding also agrees with how long-tenured CEOs are less likely to have appropriate strategies (Wiersema and Bantel, 1992). This is of interest if cartel activity is accepted as a measure of a lack of strategic change ability, i.e. opting for the status quo amongst cartel firms.

According to Miller (1991), long-tenured CEOs are less likely to achieve the match between an organisation's strategy and structure on one hand, and the challenges set by its environment, on the other, than their short-tenured counterparts. In a more particular manner, an inverse relationship exists between CEO tenure and the prescribed match between organisation and environment, especially in indeterminate settings and with ownership concentration. A positive relationship prevails in the match between environment and strategy on one hand, and financial performance, on the other.

In the study of Lausten (2002), it was emphasised that inverse relationship prevails between CEO tenure and firm performance, with evidence showing a range of measures for corporate governance and corporate performance. The threat of turnover serves as an ensuring factor that CEOs act

according to the interest of shareholders. Additionally, the ownership of the firm reinforces the relationship between CEO turnover and firm performance.

Therefore, it can be argued following to Han (2010), Beasley, (1996) and Kaplan and Minton (2008) that CEOs in cartel firms have a shorter tenure than CEOs in non-cartel firms. Therefore, the empirical proposition below is examined to test for the relationship between the length of the CEO's service on the board and cartel formation, the CEO tenure (CEOTEN) was included in the model. Similar to Chaganti *et al.*, (1985) and Shivdasani (1993) the CEO tenure was calculated as uninterrupted years on the board. Controlling for poor firm financial performance, firm ownership status, current ratio, firm sale, and Herfindahl index, a negative coefficient is expected:

P10: *The number of years a CEO had served as a director for a cartel firm is less than that for non-cartel firms.*

- **CEO Gender**

Oppression of women has always been present in the workplace, especially amongst the higher management. In today's world of corporate finance the CEO is responsible for the operations of the firm hence his/her decisions are given priority accordingly. Several scholars discussed gender issues with regards to different areas for instance, firms' performance, market reaction, and risk taking behaviours, etc.

According to Brennan and McCafferty (1997), there have been recommendations that there are two benefits of keeping women on board. One benefit is that women may know more about needs of customers, have more knowledge of consumer behaviour and chances for firms of meeting needs of customers. Another benefit is that women are more independent since they are not part of the **"***old boys*" network**.** These are some evidences that state that a firm's value can increase when there are women on the board. There could be competitive advantage attained by a firm by keeping women on the board as it would first lead to improved corporate governance (Bernardi *et al.*, 2002).

Evidence from the U.S market about the effects of gender on the reaction of the stock market subsequent to a CEO appointment is indicated in the study of Triki, Sami, and Ureche-Rangan (2012). The study likewise makes an assessment of the impact of the characteristics of female candidates on observed returns. The findings suggest that a significant difference does not exist in the

stock market reaction subsequent to a CEO appointment. However, a negative effect on observed returns is indicated by nomination of insider female candidates. Moreover, the sector of activity where the firm operates affects the market reaction.

Another study conducted by Burke and Mattis (2000) shows that response towards women CEOs of a firm by the overall markets is unappreciative. According to Hallock (2002), the inequality of salary between male and female CEOs is due to the characteristics of the job and the workers. Mohan and Chen's (2004) study shows that the IPO pricing is irrelevant towards male or female CEOs. Recent studies show that women in higher management levels tend to produce better financial results (Welbourne, 1999; Catalyst, 2004). According to Wolfers (2006), firms with women leaders are capable of making mistakes on a large scale. This kind of bias is mostly found amongst male analysts.

A study carried out by the US non-profit organisation for women's advancement. This study showed that in Fortune 500 firms characterised by higher proportion of women in top level management, there was 34% increased total return to shareholders and 35% higher return on equity. Hence, firms with most proportion of women in top level management performed considerably better than those with the lowest proportion of women (Catalyst, 2004).

Cheung and Hernandez-Julian (2006) as well as Swamy *et al.* (1999) exhibit in their studies that men have more ability to be corrupt than women. Factors such as experience and work attitude between men and women have shown that women have less chances of being corrupt as compared to men.

According to Sundén and Surette (1998) and Bernasek and Shwiff (2001), when it comes to the provision of wealth in pensions, women are considerably more risk averse. In a study on betting behaviour of men and women by Bruce and Johnson (1994) and Johnson and Powell (1994), it was observed that women show a lesser inclination towards risk-taking than men. Variations in risk-taking in both genders are also present in a military framework (Hudgens and Fatkin, 1985).

The following different works depict that female fund managers are generally more risk averse than men or at the least, both are equally risk-averse. Thus, differences in both genders are mainly in terms of risk-aversion. Through the research of Niessen and Ruenzi (2007), it can be stated that female fund managers are more risk-averse that male fund managers; they follow less risky

investment patterns that are also temporally steady than those of male fund managers**,** and do not diverge too much from benchmarks. When Atkinson, Baird and Frye (2003) compared the investment behaviour and performance of both genders fixed-income mutual fund managers, it was found that funds managed by each gender are not very different from each other. This could be said in relation to risk, performance, and other related features. Moreover, male fund managers trade more than female fund managers. Thus, when the various risk-adjusted performance measures were used, there was no considerable difference in the average performance of male and female managed funds.

Additionally, the Meta-analysis is an example of a study on the presence of gender differences in the tendency to take risks. Its results stated that it is quite apparent that "male participants are more likely to take risks than female participants" (p. 377). This study was conducted by Byrnes, Miller, and Schafer (1999) who studied more than 150 papers on gender differences in risk perception.

Considering the existing research, there had been other important researches that include five various content domains to evaluate the risk that can be observed in the behaviour of men and women. These domains are health/safety, ethical, social financial and recreational decisions. It was observed that men are less risk averse and have greater tendency to work with risky behaviours. Four out of five domains depicted gender differences, social decision making being the exclusion. This study was conducted by Weber, Blais, and Betz (2002). Even in a big German sample conducted by Johnson, Wilke, and Weber, 2004, using these domains, similar gender differences were observed. These above mentioned researches were carried out to evaluate in depth the generality and cognitive foundations of these differences (Slovic, 1997).

In relation to gender differences in risk attitudes, a research was conducted, which showed that context is quite important (Schubert *et al.*, 1999). Women and men's risk attitudes were checked in this test in terms of their similarities or differences in relation to whether they have to decide on certain investment or insurance problems (no differences exist) or an abstract gamble (differences exist). The outcome of the study was that there were no noticeable gender differences when it comes to real-life contexts such as financial decisions. This could lead to the thought that noticeable gender differences may be present in terms of differences in opportunity sets. There are even more researches showing that women might be more risk-averse (Hershey and Schoemaker, (1980)). Lately, newer surveys observed that whilst having equal economic status, portfolios of single men are more risky than single women (Jianakoplos and Bernasek, (1998); Sundén and Surette, (1998)).

Compared to men, women are more in favour of using financial advisers; they have lesser risk preferences and a greater amount of anxiety when it comes to financial decision-making (Stinerock *et al.*, 1991).The effect of gender on asset allocation in retirement pension accounts was evaluated by Powell and Ansi c (1997). According to the authors, the allocation of investments in retirement plans is affected by gender differences. The final outcome of the study was that when it comes to selection of allocation of funds in their retirement savings account, women tend to show increased risk aversion. Another study examined the association between gender and the investment plan of a person who has the opportunity to select his own retirement plan. This was conducted by Sundén and Surrette in (1998). According to the study, asset allocation decisions were not affected by age and education; however, marital status and gender do influence the decision of individuals in the allocation selection of assets in the pension account.

Research usually examines the results of decisions made by men and women instead of the whole decision-making process, which makes it hard to understand the element of gender differences. Gender differences could also be due to gender discrimination and different choices made by individuals (Bajtelsmit and Bernasek, 1996). There have been studies stating that in a number of activities comprising financial decision-making, women show increased risk aversion than men (Hintz, *et al*., (1997); Jianakoplos and Bernasek, (1998); Bajtelsmit and Bernasek, (1996)). However, there are also those showing completely different results, which state that in relation to premium pension portfolios, married women are willing to take more risk than unmarried women (Sundén, 2004). Another contrasting study is that women, under controlled economic conditions, generally do not make less risky financial decisions. This study is in contrast with the studies mentioned earlier in terms of variations in how male and female opportunity sets are framed (Schubert, *et al*., (1999)).

Byrnes *et al*., (1999), in a Meta study of 150 previous studies, compared the risk-taking inclinations of male and female participants in different risky activities. They stated that men are willing to take more risk than women and as age increases, this gender difference in risk taking tends to decrease. Gender difference existed differently amongst many activities and decision contexts. In another study, it was observed that women are more risk averse than men. It was stated that female fund managers "take less risk and follow a less extreme investment style" (Niessen and Ruenzi, 2006). However, the authors also stated that there has been no indication of difference in fund performance even with the presence of risk-related behavioural differences between female and male fund

managers. Thus, with the risk-averse investment approach of women, similar results were drawn. According to Barber and Odean (2001), men trade 45% more than women. This was found through an analysis of the common stock investment behaviour of men and women from February 1991 to January 1997 in the USA. According to the authors, since men are more confident, they tend to trade more frequently than women. There was an observation, after seeing outcomes from controlled experiments, that women seem to be more risk averse than men and that they invest less (Charness and Gneezy, 2004).

It is stated that when seen in the context of corporate decision making, gender differences may not exist. This is because either the women would try to outdo men when it comes to taking risk or since the decision would be made together by men and women, there could not really be gender differences in the decision made. Women could also be following the pattern of men in relation to risk taking behaviour, thereby removing any gender differences. When the stock-selling behaviour of male and female executives is observed in relation to stock option rewards, it can be indicated that since male executives are more into diversification-related stock sales than female executives, male executives are more risk-averse (Zahid, *et al*., 2006). Hence, when discussions on whether female executives or male executives are more risk averse, the outcomes are quite varied. Women are inclined to take less risk and follow a less extreme investment strategy when they play the role of an individual or institutional investors (Barber and Odean, 2001; Charness and Gneezy, 2004; Niessen and Ruenzi, 2006). However, men are more risk averse than women executives when they are corporate executives (Zahid *et al.*, 2006).

Moreover, an analysis of 150 studies ranging from 1967 to 1997 was made by Byrnes, *et al*., (1999). In their study, a comparison was made on male and female risk-taking inclinations in a number of different settings. It was observed that in 14 out of 16 different activities, men were more willing to take risk than women. In a survey of economic literature conducted by Eeckle and Grossman (2003), drawing outcomes from field studies, abstract gambles and contextual experiments were analysed and compared. The results from laboratory experiments were less certain but field studies led to the decision that women are more risk-averse than men.

Consistent with the previous studies this study expects to find a similar result to Cheung and Hernandez Julian (2006); Swamy, *et al.* (1999); Zahid *et al.*, (2006); Eeckle and Grossman (2003); and Byrnes, *et al*., (1999) that women (CEOs/executive) are less likely to participate in risky

activities of corruption and they are risk-averse. The proposition below is empirically tested by controlling for firm ownership status, current ratio, firm sale, and Herfindahl index. Negative and significant coefficient is expected.

P11: *Female CEOs are less represented in cartel firms than in non-cartel firms.*

- **Multi-directorship (Busy Directors)**

Busy directors, as defined by the National Association of Corporate Directors (1996) are those who have more than three directorships and six for directors who are retired. A CEO is said to be busy according to the number of directorships he/she holds. Shivdasani (1993), in his research, shows that the efficiency of a director holding a number of directorships has no harmful connection with the problems faced by the agency.

Ferris *et al* (2003) found in their study that directors nearing retirement age might consider multiple directorships. Age is said to serve as a proxy for the director's experience and the energy needed for the demands of board service. The study found that the regression for the number of directorships vis-à-vis age involves a significant positive co-efficiency. It also suggests that older directors with greater experience of directorships are no longer interested in additional directorships or might pose as less attractive candidates. The average age of directors is also older in boards with multiple directors. In a particular corporation, arbitrary terms are not held by the board as a limitation that may be imposed on directors' service. The board does not also maintain a position that directors must be remunerated annually until upon reaching the mandatory retirement age (Clayman, Fridson, and Troughton, 2012). It must be noted that Ferris *et al.* (2003) have not seen any association between multiple directorships and increased likelihood of fraud litigation. The evidence they gathered demonstrated that calls to limit directorships were not supported.

Studies by Fama and Jensen (1983) show that those directors with numerous of directorships, are more likely to be hired by firms. Good governance practices are found in those directors who are part of more than one board and carry out multi-directorship. According to Gilson (1990), Kaplan (1994), Brickley, Linck and Coles (1999), Shivdasani (1993) and Ferris *et al*. (2003), efficient work is related to the number of directorships a director holds. The results of these authors show that boards of directors of firms committing fraud are less likely to have directors who work on other boards, compared with boards of directors amongst non-fraud firms.

In the contrary, Roe (1994) and Jensen (1993), argues that directors holding multiple directorships may not be able to make effective decisions. Shivdasani and Yermack (1999) study shows that busy directors have a high likelihood to be chosen as directors by the firm managers. Some believe that numerous number of directorships do not affect the goals of a firm. An Act passed in the United States known as the Clayton Act considers it as illegal if a director holds directorships of rival firms in the U.S and if joint as a sole firm there would be a serious violation of the antitrust laws. However, two out of eight rival firms is combined together as a single corporation in the U.S. (Roe, 1994)

Firms have been generally criticised by shareholder activists and institutional investors for having appointed directors with multiple directorships in different firms, maintaining that these directors are not capable of effectively monitoring the management of several firms. Mainstream critics such as Chancellor William Allen (1992) argued that time and resources must be committed to effective monitoring. It has been claimed by the Council of Institutional Investors (1998) that if there are no atypical and highly specific circumstances prevailing in the firm, full-time directors must not occupy more than two other boards. By contrast, the Business Roundtable (1997) advised that firms must be required to limit the number of directorships.

Directors themselves were not in favour of the exercise of multiple directorships due to insufficiency of time for discharging their professional responsibilities, which is the most common reason for such refusal (Lipton and Lorsch, 1992). Moreover, it was revealed in a survey of directors of Fortune 500 firms that a director experienced too much burden with too many board appointments. About 56 percent of outside directors have also reported having refused an invitation for additional board assignments due to lack of time. It is apparent that these directors perceived that excessive board assignments might dispel their time and attention and might also cause them to undermine their ability to monitor management. The same study also discovered that majority of directors held that limitation must be placed on the number of boards in which CEOs and other inside directors were appointed. However, directors were evenly divided in terms of whether outside directors must indeed be given limitation in their management of the firm. Therefore, it has been a controversial topic to whether an individual director's capacity to monitor management is impaired by his exercise of multiple directorships. Despite such controversy, only little research was carried out involving the impact of multiple directorships on corporate performance (Lipton and Lorsch, 1992).

It was also reported that positive relationship exists between one's potential to commit accounting fraud and an outside director's average number of directorships (Beasley, 1996). Similarly, busy directors tend to set CEO compensation at excessively high levels, which in turn results in poor firm financial performance.

However, other evidence indicates that multiple directorship is positively related to firm success, as shown by the results involving Japan's cotton spinning industry during the 20th century, where directors held multiple directorships (Miwa and Ramseyer, 2000). It was also reported that larger premiums in tender offers were received by shareholders when multiple directors were included by the board (Cotter, Shivdasani, and Zenner, 1997). In addition, superior acquisition-related returns were enjoyed by firms when their directors held multiple directorships. These studies indicate that multiple directorships are parallel with shareholder interest. The specialised settings and circumstances of these results however place the generalisability of these results to becoming open to question.

Moreover, Pfeffer and Salansik (1978) posit that firms can benefit from the boards through these boards' stance to act as channels to communicate information between the firm and external organisations. This way, organisations are able to reduce uncertainty related to strategic decision making. Other firms are also able to observe other firms by means of their board interlocks and hence facilitate inter-firm learning and dispersion of ideas, strategies, practices, and behaviours (Strang and Soule, 1998).

Therefore, this study follows Gilson (1990), Kaplan (1994), Brickley, Linck and Coles (1999), Shivdasani (1993) and Ferris, Jagannathan and Pritchard (2003), who have argued that boards of directors of firms committing fraud are less likely to have directors who work on other boards, compared with boards of directors amongst non-fraud firms. In similar vein to the previous studies by controlling for poor firm financial performance, firm ownership status, current ratio, firm sale, and Herfindahl index, this study empirically tests the proposition below; negative coefficient expected:

P12: *Boards of directors of a firm committing cartel crime are less likely to have directors who work on other boards, compared with boards of directors of non-cartel firms*

- **CEO/Chairman Concentration Power**

According to the Cadbury Committee Report (1992) CEO concentration power should be disapproved. This came about through the belief that when an individual holds two titles, corporate governance may suffer due to the ensuing conflicting interests.

Mixed results are once again achieved when the CEO's role is differentiated from that of the chairman of the board (Zahra and Pearce 1989; Dalton *et al*., 1998). The impact of this disintegration on board performance is likely to be favourable, as the principle-agent view suggests, because the power of the CEO is distinguished from that of the Board Chairman (ibid).

The dual nature of the leadership of the board was examined by Berg and Smith (1978) using four performance measures. Only one measure, total return to investors, showed that when the roles of CEO and Chairman were combined, the performance was negatively affected. Mixed results were attained by Boyd (1995), showing the positive impact of concentration power of leadership in some cases and the opposite in others. However, he stressed that the corporate governance movement of separating the role of CEO and chairman was not supported in his studies.

Firm bankruptcy did not come about through the integration of the Chairman's and CEO's role, according to Changanti, *et al*., (1985). Alternatively, Rechner and Dalton (1989) ascertained that financial performance was not enhanced when these roles were dissociated. Evidence was found in a following study by Rechner and Dalton (1991) regarding the better performance of those firms that had an independent board rather than those who had a combined role of CEO and Chairman of the Board. The meta-analysis of Dalton, *et al*., (1998) conversely determined the lack of relationship between financial performance and board leadership.

Core, Holthausen, and Larcker (1999) report that CEO/Chairman concentration power is linked to higher CEO compensation, and Goyal and Park (2002) show that CEO concentration power reduces the sensitivity of CEO turnover to firm performance

Combining the positions of the CEO and the chairperson is often done by firms, thereby allowing the CEO to carry out managerial and oversight functions – two important functions of corporate governance. The CEO therefore oversees the direction of the firm and at the same time, manages its

operations. The CEO in a concentration power must have vision, strategy, problem-solving skills, and motivation (Rezaee, 2009).

It is said that 75% of fraudulent cases of financial statements studied by Loebbecke *et al.* (1989) show that only one individual is responsible for operating finances and making financial decisions, thus giving a chance to defraud easily. As Jensen (1993) argues, besides his/her own interest, a CEO is not authorised to take charge over the chairperson's monitoring job of financial statements.

The CEO is the most authoritative and dominant person of the firm. The Chairperson of the board has the responsibility to employ, evaluate, compensate and dismiss the CEO of the firm. Meetings of the board of directors are conducted by the chairperson as well. To create an efficient monitoring system by the board it is necessary to make the chairperson and the CEO of the firm into separate entities (Mintzberg, 1983).

There are many different views on the CEO concentration power and firm performance levels; however, Dalton (1992) states that there exists no relationship whatsoever. Coles *et al.* (1997) also find that there is no negative relationship between the two. A sample of fortune 500 firms is taken into account by Rechner and Dalton (1991) which shows that the concentration power of the CEO provides a positive effect on the performance of the firms. If there is no concept of CEO concentration power in the firm, it is therefore very much sensitive to the CEO turnover and firm performance levels (Goyal and Park, 2002). Many of the agencies present in the U.S. have established regulations against CEO concentration power due to the insider activities taking place; for instance, the recent division of the roles of Chairman and the CEO of the NYSE.

There is an impediment to the ability of the board to supervise managerial activities due to CEO concentration power, as Fama and Jensen (1983) and Jensen (1993) put forward, leading to a rise in the cost of agency. Firm performance is consequently going to be enhanced when the roles of Chairman and CEO are separated.

CEO concentration power, however leads to an improved performance of the firm by providing a definite leadership that takes care of strategy development and implementation, as the arguments of Stoeberl and Sherony (1985) and Anderson and Anthony (1986) suggest.

When there are separate roles of the CEO and chairman, the issues of cost of sharing information, disputes between the two parties and inefficiency may arise. Communicating information pertinent to the organization in a timely manner may be costly; it would be difficult to find out who is responsible for the poor performance of the firm and the process of making and implementing decisions may not be as efficient when there are two leaders instead of one.

Accounting performance measures of the banking industry and CEO concentration power are negatively related as has been determined by Pi and Timme (1993). When there was a change in the status of concentration power, there was no subsequent change in performance according to Baliga, Moyer, and R. Rao (1996). No substantial difference is found by Daily and Dalton (1997) with respect to performances with dual CEO or non-dual CEO organizations.

A positive relationship has been provided by Dahya and Travlos (2000) with respect to CEO concentration power and firm's success. The separation of the roles CEO and Chairman of the Board in the UK firms does not show an improvement in the performance of these firms (Dahya, 2005). According to Faleye (2007), organizational intricacy, managerial ownership and CEO reputation have a positive relationship with CEO concentration power, suggesting that the costs and benefits of having an alternate leadership are not considered by the firm.

The CEO attains a huge base of power and locus of control when he also holds the title of the Chairman (Hambrick and Finkelstein, 1987; Patton and Baker, 1987; Harrison et al., 1988), which weakens the control of the board on decisions (Morck *et al*., 1989). Achieving the CEO's agenda, which might be significantly different from the goals of the shareholder, becomes easier when there is a weakening of board control (Mallette and Fowler, 1992). Thus, when the titles of CEO and Chairman are combined, there would be a deteriorating control on the board, resulting in poor performance of the firm as the agency theory suggests.

Following Fama and Jensen (1983) and Morck *et al*., (1989) who have documented that CEO concentration power could hinder board's capability to monitor management and thus raise the agency cost. Therefore, to test for the CEO's ability to affect the board monitoring, this study includes **(BOSS)** variable for situations where the CEO and chairperson positions are combined using a measure consistent with that used in Shivdasani (1993), and Beasley (1996). Controlling for poor

firm financial performance, firm ownership status, current ratio, firm sale, and Herfindahl index, a positive and significant coefficient is expected;

***P13**: Firms that commit cartel are more likely to have CEOs serving as board chairs compared to non-cartel firms.*

3.6.4 Does CEO Compensation Scheme Matter?

Top management levels are responsible for deciding on forming cartel and imposing this decision upon the management who strives to hide any kind of collusive agreement (Harrington, 2006a). Many compensation schemes are provided to top managers and it is necessary to understand if these schemes may help in stopping the managers from forming collusive agreements.

In the 1990s, managerial compensation and empirical literature relating to this was much more popular than the 1980s (Jensen and Murphy, 1990). Along with dynamic competition in the market, several incentive schemes have been developed, including bonus contracts by contractors to thoroughly understand the competitive behaviour. Collusive agreements are managed efficiently by those managers who have limited incentives and bonus plans (Spagnolo, 2005).

The incentives provided to a manager decline as the period increases. He also receives less marginal utility from higher profitability. They start to believe that a price war would help them reap more benefits in the form of profits rather than carrying out the collusively agreed strategies. To avoid this issue it has been recommended that bonuses and compensation caps must be provided to the managers in the form of schemes (Healy 1985; Gaver *et al.*, 1995). These bonuses would be provided if firm profitability is up to a certain level. As profits increase, bonuses also increase. However, it is always found in firms that an upper bound is set on the bonus above which the profits are not provided (Murphy, 1999).

Moreover, stock-based compensation plans have been introduced in the business world to build a positive attitude within the managers and reduce the tacit collusion and social welfare activities. A period of four years is usually observed where the liquid plans awarding stock based bonuses are provided, after which, a new plan is formed after the period expires (Kole, 1997). A classical model of repeated oligopoly can also incorporate this plan to manage the collusive behaviour. In a perfect potential stock market, the dividends are justly distributed and the incentives may be deferred,

causing compensation packages to enhance the collusion (Spagnolo, 2000). With the help of the stock-related incentives, the management of the organisation is linked strongly to the profitability of the organisation.

The collusion stability may be improved with the help of stock related compensation since the stock market foresight may be perfectly informed about the collusive agreements. The punishments that have been decided may be discounted in the current stock prices which would reduce the levels of gain from defection (Spagnolo, 2000). Managers prefer a smoother stream of profits where they carry out collusion activities, which can create stability (Spagnolo, 1998). If they do not have this stream then they become highly dissatisfied with the incentive, which leads to low punishment profits for the future. If the selected bonus is efficient then the defection gain will be limited and the collusion would show stability (Spagnolo, 1998).

Executive compensation is used by shareholders as a way of lining up managerial interest with their own since CEOs/executives are the agents of shareholders, irrespective of the gender. Although since women executives have been found to be risk averse or have a risk seeking behaviour, as mentioned previously in the thesis, their reaction to risk incentives as part of the executive compensation might be different. To be protected from a downside risk is the mostly thought of reason for stock option compensation. This is because a stock option, also being a call option on the firm's shares is only linearly linked to the stock price when the stock price goes beyond the exercise price of the option (Feltham and Wu, 2001). Another reason is that as the firm's stock return is volatile, the value of the stock option rises. This is because of the convexity of payoff i.e. tremendously high stock option value at high stock values. Therefore, through stock option compensation, risk-averse managers are encouraged to be involved in risky investment projects including risky acquisitions and managerial risk aversion is also offset (Guay, 1999; Datta *et al.*, 2001 Coles *et al.*, 2005).

There is another way through which an incentive is given to managers to increase the performance of the firm. This is restricted stock, which is a type of equity based compensation, and is linearly linked to the stock price. However, this method, leads to too much risk of the managers' wealth and even increases managers' risk aversion since the linear payoff does not reduce the down-side risk (Bryan *et al.*, 2000; Ryan and Wiggins, 2002). Male and female CEOs and executives may react in different ways to the pay-for-performance incentives which however do not restrict downside risk. This is because there are gender differences in risk taking. There has been experimental study which

compared both compensations, showing that option-based compensation leads to increase in risk-averse managers to go for risky but value-increasing investment projects, than is done by stock-based compensation (Bryan *et al.*, 2000).

Therefore, following Spagnolo (1998, 2000 and 2005), this study empirically tests the following propositions; positive and significant coefficient is expected from all.

P14: *The average CEO bonus for cartel firms is higher than non-cartel firms.*

P15: *The average CEO share for cartel firms is higher than non-cartel firms.*

P16: *Total CEO compensation for cartel firms is higher than non-cartel firm.*

Table 3.1: List of Propositions

Board Characteristics:	
P1:	The size of board directors is larger for firms committing cartel than for a matched sample of non-cartel firms
P2:	The percentage of independent (non-executive) members on the board of director is lower for firms committed cartel crime than for non-cartel firms.
P3:	The average age of board directors for cartel firms is lower than non-cartel firms.
P4:	There are less female directors on the board of cartel firms than the non-cartel firms.
P5:	The average duration of the cartel board is less than the non-cartel firms
P6:	Board remuneration for cartel firms is higher than non-cartel firms.
Ownership Structure	
P7:	The percentage of outside directors' stock ownership is lower for cartel firms than for non-cartel firms
P8:	Cartel likely to be formed by family-owned and controlled firms (large shareholders).
CEO Characteristics	
P9:	The age of the CEO for cartel firms is higher than non-cartel firms
P10:	The number of years a CEO had served as a director for a cartel firm is less than that for non-cartel firms
P11:	Female CEOs are less represented in cartel firms than in non-cartel firms.
P12:	Boards of directors of a firm committing cartel crime are less likely to have directors who work on other boards, compared with boards of directors of non-cartel firms.
P13:	Firms that commit cartel are more likely to have CEOs serving as board chairs compared to non-cartel firms.
CEO Compensation Scheme	
P14:	The average CEO bonus for cartel firms is higher than non-cartel firms
P15:	The average CEO share for cartel firms is higher than non-cartel firms
P16:	Total CEO compensation for cartel firms is higher than non-cartel firm

3.7 Chapter Summary

This chapter provides a discussion of the literature review and hypothesis development for the study. It begins with clarifying the concept of corporate governance and the theoretical background underlying the formation of cartel. The literature review elucidates the CEO role in corporate governance and in forming cartels. It also tackles how shareholders act in cartel formation. The hypothesis development, on the other hand, is focused on the characteristics of the board and whether the CEO characteristics and compensation scheme matter. The empirical investigation embodying the theoretical background is built upon agency theory, aiming to clarify the empirical relationship between corporate governance structure and cartel formation. Analysing the corporate governance structure necessitates investigating the structure of the board of directors and the manner in which their activities impact the performance of the organisation. The list of propositions provides a summary of the hypotheses relating to board characteristics, CEO characteristics, and CEO compensation scheme to determine how corporate governance structure impacts the propensity of cartel formation.

The next chapter provides a discussion of data description and data collection, thereby clarifying how cartel data are gathered and offering basis for the furtherance of this research.

Chapter Four

Data Description

This chapter describes the sources of data and method of data collection. It discusses how the sample of cartel was obtained, including the two screening stages used to examine the initial set of cartel identified into a usable sample. The resulting cartel data are then compared with the initial sample and their characteristics are described in more detail. Besides these, this chapter discusses how the benchmark set of firms that have no known cartel participation is obtained, and their characteristics.

4.1 Cartel Data

4.1.1. Sources

The initial aim is to create a data set of firms that have been found to be involved in cartel formation. The starting point is to identify all cartel firms that participated in cartel and are sentenced by the U.S. Department of Justice (DoJ), and/ or by the European Commission (EC), and/ or by the Competition Commission (CC) / Office of Fair Trading (OFT) for the whole period over which information on cartel cases is available.

Several databases are used in the cartel sample selection and cartel data collection phases of this study. The first set of sources are the DoJ, the EC and CC/OFT. The second is the LexisNexis database. The third set includes the academic working papers by Levenstein and Suslow (2006 and 2002), Levenstein, Suslow, and Oswald (2003) and Connor and Helmers *(*2006). The forth source includes data obtained from Prof. John Connor of Purdue University.

4.1.2. Data Collection Methods

Finding relevant information on cartel and firms involved is a considerable task. It is not easy to obtain the needed data from the EU, UK, and US authorities. This is because the DoJ, for example, does not provide detailed information about all cartel cases being sentenced and the detailed information about firms involved. The DoJ is also less transparent about its cases than EC and CC/OFT where cases are discussed in more detailed. In fact, the DoJ's website does not contain comprehensive information about cases and their outcomes; and in multiple cases, there is no

information about firms that have been sentenced. For example, it is quite common for the DoJ to report that there was a cartel case involving several firms but does not however provide any information about which firms are involved, and the resulting outcomes, as well as the penalties imposed. It means that after several months spent on building a suitable cartel database (24 cases from DoJ, 76 cases from EC and 52 cases from CC/OFT), a total of 152 cases were collected.

Several attempts were made to contact the DoJ to ask for an access to the information about their cartel cases that were not publicly available, but they have refused to provide any information. However, it was helpful to have acquired the data from a professor of Purdue University, who has written extensively on international cartel from an economic perspective. His sample of 314 cases was used in his 'Statistics on Modern Private International Cartel' (Connor and Helmers, 2006). The data gathered by Connor and Helmers were collected from several sources, such as antitrust authorities (e.g., DoJ, Canadian Competition Bureau (2002), and EC); newspapers and magazines (e.g. *Chemical Market Reporter*, *Oil and Gas Journal*, etc. - *Factiva, LexisNexis*); academic working papers (e.g. Levenstein and Suslow (2003 and 2006); Evenett *et al.*, 2001); Organisation for Economic Cooperation and Development (OECD 2002) and its annual competition-law reports by members.

Even though obtaining John sample was useful, there were some problems with his data, such as incomplete information on some cartel cases and several missing data. Furthermore, as the purpose of this research is to find out which characteristics of the participating firms' boards of directors are associated with cartel formation; this research only intends to study those firms that have been found to be operating cartel. Therefore, having assembled the initial sample, it was necessary to screen the cases to ensure that all were suitable for the study. Cases were excluded on three grounds:

1. **If the case was still under investigation**. Eight cartel cases were excluded, as a decision was not yet reached at the time of the sample collection.
2. **If no sentence date/year had been reported.** There were 75 cases in this category.
3. **Some cases do not identify the firms participating in the cartel, which makes it impossible to get information about them.** A further 58 cases were excluded on this basis.

Altogether, 141 out of the 314 cases from Connor's database were excluded as a result of the screening process. Additionally, combining the set of data that was collected from DoJ, EC archive,

and CC/OFT (152 cases) with Connors' data (173 remaining cases), a full list of 325 cases and 1,901 firms were obtained.

The sample of 1,901 firms contains those located across multiple countries. It means that this study would need to collect information about corporate structure and financial data from different countries around the world and to collect a matched set of data for the benchmark study. As the University of Bath does not have the sources to cover all of these countries therefore, a further round of screening to obtain the eventual sample used in the study then followed the initial screening **(**the full set is available on request**).** The following additional criteria were used in the second screening to select the final cartel sample:

4. Cartel cases were chosen based on **at least one firm of UK origin amongst cartel members**. As a result, the number of cartel cases was reduced to 93 cases whilst the number of firms was reduced to 681.
5. Only cartel cases operating between 1990 and 2008 were included to allow three years of information to be collected before the cartel started. This additional step reduced the number of cartel cases to 60 and the number of firms to 457 firms.
6. Cartel firms identified in steps 1 and 2 were included in the final sample if governance data and financial statement data were available for the time period. Since there were no sources at the University of Bath to collect the governance data for some countries (e.g., Brazil, Mexico, etc.), the sample was reduced again; hence, the total sample size was 150 firms in 52 cases. The final cartel sample selection is summarised in Table 4.1 below:

Table 4.1: Selection of cartel firms

Description	Firms Identified	Number excluded	Number of firms remaining
All identified cartel firms before screening	**3200**		
Less:			
1. Firms under investigation		37	3163
2. Cases without date/year		518	2645
3. Anonymous firms		744	1901
Cartel firms identified after first screening		1299	**1901**
Less:			
4. Firms in cartel without at least one UK firms		1220	681
5. Firms in cartel active outside 1990-2008 period		457	224
6. Firms without suitable financial and governance data		74	150
Final sample of cartel firms			**150**

Source: Author's own calculation

As a result of the two screenings, the total number of cartel firms used in this research is **150;** however, the cartel firms are divided into two types of cartel abusers:

- **Single abuser:** firms that committed cartel and were sentenced once and appeared once in the sample.
- **Multiple abusers (Recidivism)[1]:** firms that have committed cartel more than once and appeared in the initial sample and the study sample more than once in different cases.

Therefore, the 150 cartel firms of which 114 are UK firms consist of 102 single cartel firm abusers and 19 multiple cartel abusers (counting multiple abusers and cartel firms once only). It means that the total number of firms when the multiple cartel firms are counted only once is 121. Table 4.2 below shows the firms' distribution for both single cartel firms and multiple cartel firms:

Table 4.2: Distribution for Both Single-Cartel Firms and Multiple-Cartel Firms' Abusers

Country	Number of Firms	Single abusers	Multiple abusers
Australia	1	1	0
Canada	2	0	1
France	8	1	3
Germany	5	1	1
Ireland	2	2	0
Italy	1	1	0
Japan	3	1	0
Netherlands	2	2	0
New Zealand	1	1	0
Singapore	1	1	1
Spain	1	1	0
UK	114	83	12
US	9	7	1
Total	**150**	**102**	**19**

Source: Author's own calculation from main data set

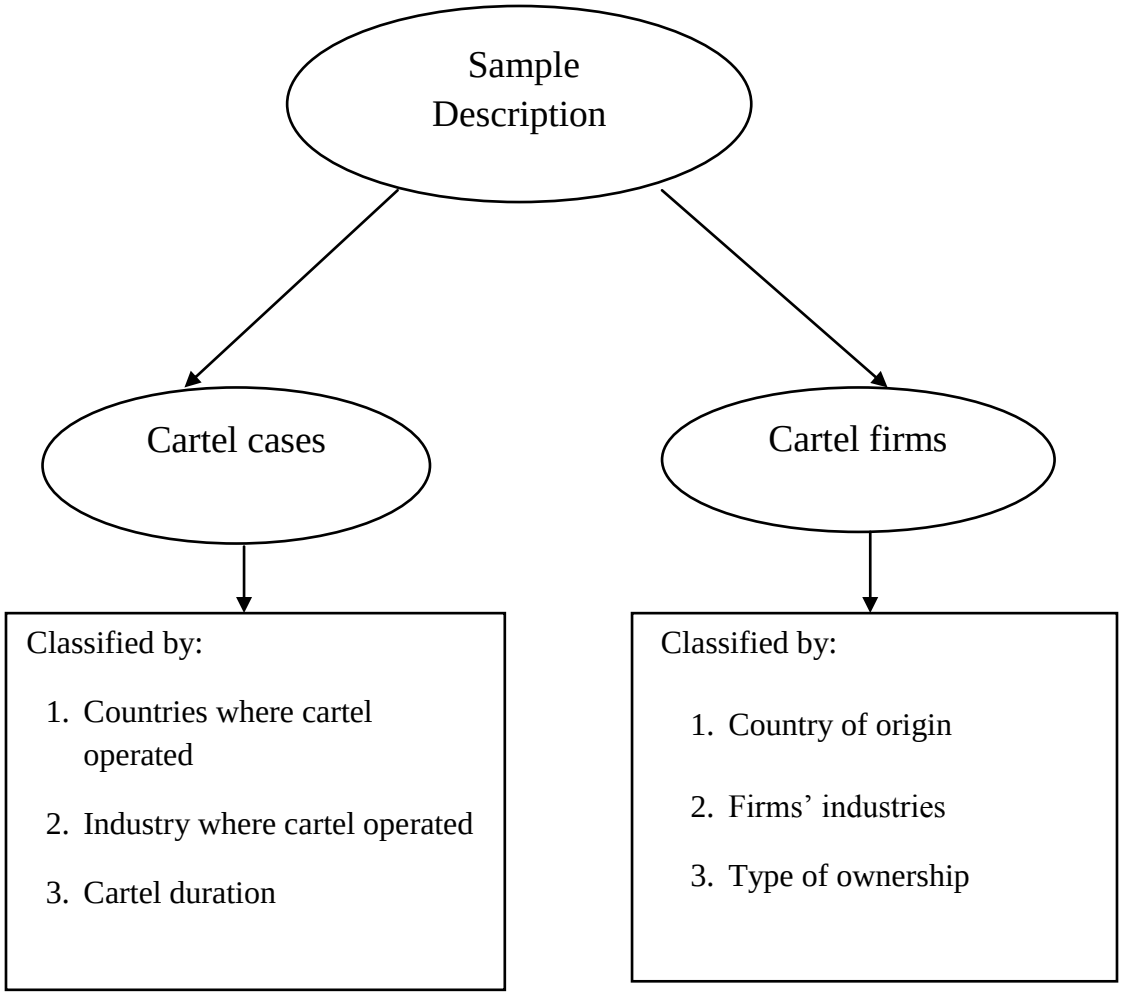
UK firms, having significantly generated the most number amongst the included countries of origin, are **the focus of cartel formation and discovery**.

[1] Recidivism is: one of the most fundamental concepts in criminal justice. It refers to a person's relapse into criminal behaviour, often after receiving sanctions or undergoing intervention for a previous crime (Maxfield and Babbie, 2012) .

4.2 Data Description

The sample used to test the hypotheses in this research consists of 150 cartel firms in 52 cartel cases, taken out of the initial sample of 1,901 firms and 325 cartel cases. In order to describe the sample and compare it with the original, the data are categorised at two levels: first, at a cartel level; and second, at a firm level. Figure 4.1 below contains the classifications used in each case:

Figure 4.1: The classification of the sample description



Source: Author's own construction

4.2.1 Description of Cartel Cases

1. By countries where cartel operated

The geographical location of where cartel cases operated are divided into three groups; EU, global and domestic cartel:

- **International:** cartel fixed or attempted to fix prices on at least two countries.
- **Domestic (National):** cartel limited their operations to one country.

Therefore, ***the initial 325 cartel cases*** are divided in 262 international cases, and 63 domestic cartel cases (23 cases in the U.S and 40 cases in the UK).

Out of 52 cartel cases used in this research, 35 are international cases and 17 cartel cases operate domestically (5 cases operate in the U.S and 12 cases operate in the UK). Table 4.3 below shows the number of initial and cartel sample cases in their geographical location:

Table 4.3: Geographical Location of Cartel Cases' Operations

Location	Initial cartel cases	Cartel cases
International	262	35
National	63	17
Total	**325**	**52**

Source: Author's own calculation

2. By industry in which the cartel operated

The cartel operated in a variety of industries, including chemicals, metals, paper products, transportation, and services; their members included some of the largest corporations in the world. Selecting the three-digit SIC industry code for each cartel case, which were obtained from UK Firms House, and Fame and DataStream, depending on the availability of the data for each firm , ***the initial cartel*** **cases** were a result of 46 industries for all 325-cartel cases. This figures show the major industries that cartel were operating in for the last 25 years. The largely affected industries are the chemical industry with 54 cartel cases, manufacture of basic pharmaceutical products with 25 cases, and sale of motor vehicles and wholesale of food, beverages and tobacco with 18 cases each. More than 200 of the 325 cartel occupied various branches of the manufacturing sector.

Similarly, ***the cartel cases examined in this study*** have 23 industries. The largely affected industries in this sample are the chemical industry (10 cases) followed by finishing of textiles industry with 6 cases. Table 4.4 below illustrates the cartel cases classification by industry for both the initial sample and the cartel cases used in this research.

Table 4.4: Cartel Cases Classification by Industry

SIC	Industries	Initial sample	Cartel cases
021	Forestry and logging	1	0
110	Manufacture of beverages	10	0
120	Manufacture of tobacco	2	0
133	Finishing of textiles	6	6
162	Manufacture of products of wood, cork, straw and plaiting materials	1	0
171	Manufacture of pulp, paper and paperboard	8	0
182	Reproduction of recorded media	3	2
192	Manufacture of refined petroleum products	18	3
201	Manufacture of basic chemicals; fertilisers and nitrogen compounds; plastics and synthetic rubber in primary forms	54	10
211	Manufacture of basic pharmaceutical products	25	1
231	Manufacture of glass and glass products	2	0
235	Manufacture of cement, lime and plaster	8	0
236	Manufacture of articles of concrete, cement and plaster	13	2
241	Manufacture of basic iron and steel and of Ferro-alloys	6	2
244	Manufacture of basic precious and other non-ferrous metals	8	2
261	Manufacture of electronic components and boards	3	0
262	Manufacture of computers and peripheral equipment	1	0
275	Manufacture of domestic appliances	9	0
279	Manufacture of other electrical equipment	1	1
282	Manufacture of other general-purpose machinery	11	0
309	Manufacture of transport equipment n.e.c.	1	0
321	Manufacture of jewelleries, bijouterie and related articles	3	0
324	Manufacture of games and toys	3	1
325	Manufacture of medical and dental instruments and supplies	7	2
351	Electric power generation, transmission and distribution	6	0
352	Manufacture of gas; distribution of gaseous fuels through mains	12	3
360	Water collection, treatment and supply	2	0
421	Construction of roads and railways	3	0
432	Electrical, plumbing and other construction installation activities	4	1
451	Sale of motor vehicles	7	2
463	Wholesale of food, beverages and tobacco	18	2
464	Wholesale of household goods	2	1
466	Wholesale of other machinery, equipment and supplies	2	0
471	Retail sale in non-specialised stores	7	0
477	Retail sale of other goods in specialised stores	4	1
493	Other passenger land transport	1	1
502	Sea and coastal freight water transport	12	0
511	Passenger air transport	8	2
551	Hotels and similar accommodation	1	1
612	Wireless telecommunications activities	14	4
641	Monetary intermediation	9	0
651	Insurance	4	1
692	Accounting, bookkeeping and auditing activities; tax consultancy	1	1
731	Advertising	1	0
742	Photographic activities	2	0
782	Temporary employment agency activities	1	0
	Total	**325**	**52**

Source: UK firms House

3. By Cartel duration

Table 4.5 below shows the average duration of ***cartel cases used in this research*** from 1990 to 2008. The average duration in the 1990s sample of DoJ, EC, and CC/OFT cases was four years. The average duration rose dramatically in 2002 and dropped down in 2007. Fourteen of these 52 cartel lasted for an average of four years - certainly long enough to have had a significant impact on consumers and economies.

Table 4.5: Average Duration of Cartel Cases

Year cartel started	Avg. Cartel Duration	Number of cases
1990	1.0	1
1991	7.6	10
1992	6.6	2
1993	3.3	3
1994	3.5	3
1995	8.2	2
1996	4.6	2
1997	6.2	2
1998	2.0	6
1999	4.3	3
2000	4.5	4
2001	4.0	4
2002	1.0	2
2003	2.3	4
2004	3.4	3
2006	1.0	1
Total	**4.0**	**52**

Source: Author's own calculation

4.2.2 Description of Cartel Firms

1. By country of origin

The initial data set contain 1901 cartel firms from all over the world. The highest representation is from UK firms, followed by EU firms. **This supports our choice of choosing the UK firms as it has higher representation than other countries.**

Moreover, the sample used in this study contains 150 cartel firms from all over the world, where 114 cartel firms are from the UK. And the lowest numbers of firms are from Australia, Italy, New Zealand, Singapore, and Spain. Table 4.6 below shows the distribution of cartel firms according to their country of origin:

Table 4.6: Initial Sample and Cartel Sample Firms' Country of Origin

Country	Initial sample	Cartel sample
Australia	0	1
Canada	0	2
France	0	8
Germany	0	5
Ireland	0	2
Italy	67	1
Japan	325	3
Netherlands	197	2
New Zealand	0	1
Singapore	0	1
Spain	0	1
UK	725	114
US	213	9
Other	374	0
Total	**1901**	**150**

Source: Author's own calculation

2. By Industry

The preliminary data set classified the firms' industry by identifying the three-digit SIC industry code for each cartel firm. The 1901 cartel firms were spread across 46 industries. The most number of firms are found in the chemical industry (364 firms), manufacture of basic pharmaceutical (127 firms) and those in the wholesale of food, beverages and tobacco (116 firms).

Using the same classification used in the preliminary data, the study sample resulted in 25 industries. The figure shows the major industries from which cartel firms have originated. The firms with the most number are from the chemical industry (24 firms), followed by firms that sell motor vehicles (14 firms). Table 4.7 shows the cartel firms' classification by industry for both the initial sample and the cartel sample used in this study.

Table 4.7: Cartel Firms' Classification by Industry

SIC	Industries	Initial sample	Cartel firms
021	Forestry and logging	3	0
110	Manufacture of beverages	32	0
120	Manufacture of tobacco	6	0
133	Finishing of textiles	33	13
162	Manufacture of products of wood, cork, straw and plaiting materials	6	0
171	Manufacture of pulp, paper and paperboard	63	0
182	Reproduction of recorded media	20	4
192	Manufacture of refined petroleum products	69	4
201	Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms	346	24
211	Manufacture of basic pharmaceutical products	127	6
231	Manufacture of glass and glass products	8	0
235	Manufacture of cement, lime and plaster	38	0
236	Manufacture of articles of concrete, cement and plaster	78	5
241	Manufacture of basic iron and steel and of Ferro-alloys	62	4
244	Manufacture of basic precious and other non-ferrous metals	47	6
261	Manufacture of electronic components and boards	10	0
262	Manufacture of computers and peripheral equipment	10	0
275	Manufacture of domestic appliances	37	0
279	Manufacture of other electrical equipment	6	1
282	Manufacture of other general-purpose machinery	62	0
309	Manufacture of transport equipment n.e.c.	5	0
321	Manufacture of jewelleries, bijouterie and related articles	6	0
324	Manufacture of games and toys	13	3
325	Manufacture of medical and dental instruments and supplies	31	2
351	Electric power generation, transmission and distribution	52	0
352	Manufacture of gas; distribution of gaseous fuels through mains	72	13
360	Water collection, treatment and supply	12	0
421	Construction of roads and railways	23	0
432	Electrical, plumbing and other construction installation activities	29	3
451	Sale of motor vehicles	49	14
463	Wholesale of food, beverages and tobacco	116	13
464	Wholesale of household goods	9	4
466	Wholesale of other machinery, equipment and supplies	6	0
471	Retail sale in non-specialised stores	54	0
477	Retail sale of other goods in specialised stores	20	1
493	Other passenger land transport	3	1
502	Sea and coastal freight water transport	110	0
511	Passenger air transport	55	10
551	Hotels and similar accommodation	6	1
612	Wireless telecommunications activities	47	11
641	Monetary intermediation	44	0
651	Insurance	35	3
692	Accounting, bookkeeping and auditing activities; tax consultancy	4	4
731	Advertising	11	0
742	Photographic activities	22	0
782	Temporary employment agency activities	4	0
	Total	**1901**	**150**

Source: Firms House

3. By type of ownership

The preliminary data set involves considerably more owned cartel firms than publicly quoted firms (66% versus 34%).

Nevertheless, ***the study sample has*** slightly more public than private cartel firms (58% versus 42%). The Table below illustrates the type of ownership in the sample used in this study alongside their country of origins. As mentioned earlier, the higher distribution of the firms amongst the sample is from the UK; thus the most number of both public and private firms is from the UK - by 44 private vs. 70 public firms, followed by Germany (5 privately-owned firms), and France (5 publicly-quoted firms). The table below shows cartel firms' ownership type across countries:

Table 4.8: Cartel Firms' Ownership Type across Countries

Countries	Private	Public
Australia	1	0
Canada	0	2
France	3	5
Germany	5	0
Ireland	2	0
Italy	1	0
Japan	0	3
Netherlands	0	2
New Zealand	1	0
Singapore	1	1
Spain	0	1
UK	44	70
US	4	4
Total	62	88

Source: Author's own calculation

4.3 Benchmark (Non-Cartel Firms)

This study utilises a matched sample approach to create a comparison group. This non-probability approach limits variations that might cause bias to the study (Macnee and McCabe, 2008). The use of matched sampling implies that the samples are in some way related (or *correlated).* A significant relationship exists between the matching variable and the dependent variable (Leong and Austin, 2006). The purpose of a matched sample design is therefore to ascertain that some characteristics are identical (Wood and Ross-Kerr, 2011).

To create a comparison group, matching firms are selected which have not been discovered/detected as operating cartel and referred to here as "*non-cartel firms*", this means the firm has not formed any cartel, nor had been discovered for any cartel activity. However, it must be noted that some non-cartel firms might also be in cartel but have not been discovered/detected, which cannot qualify them to be called "*cartel firms*" in this study.

Cartel firms are matched to non-cartel firms via a specific matching process. This process includes matching a cartel firm with a non-cartel firm's benchmark within the same industry, based on a ***three-digit SIC code,*** and takes into account the timing of the starting year of the cartel cases to ensure that the data for each pair came from the same period. This is an example of twinning or ensuring the identical characteristics of the samples being matched (Leong and Austin, 2006; Wood and Ross-Kerr, 2011). ***Firm size based on net sales*** is also taken into consideration along with their position in the stock exchange. The firms with similar size and position in the stock exchange are matched together. It is proposed that matching via this comprehensive set of criteria would improve the quality of matched pairs and hence the quality and precision of test results.

For the purposes of this matching process, the industry selection is based on a three-digit Standard Industry Code (SIC) assigned to each firm based on the industry they operate in. This code could be sourced from FAME database, DataStream, and firms' databases depending on the availability of data for each firm. The matching process has utilised these databases to search for appropriate matches based on the criterion data (i.e. SIC code, time and size) of each cartel firm. This variable is also used as a control variable in the regression model to control for firm's the industry.

Moreover, ***one year prior to the year when the cartel case started*** to be used for matching purposes ensures the financial data and governance data for both the cartel firms and benchmark groups from

the same time period. This additionally enables the actual performance of cartel firms - prior to cartel formation - to be used to match the pairs. Exact matches of the time criterion are sought, while acceptable limits established within which the SIC coding and size criterions are permitted to deviate. These limits are set to emulate earlier studies, such as that of Beasley (1996), which permitted industry matches to two digits SIC code and a ±25 % margin of fraud firms for matching by size.

The size criterion is determined by the net sales specified in the annual financial report issued on the fiscal year preceding the cartel incident. Matching the pair on a size criterion is deemed important to ensure that both cartel firms and non-cartel firms share relatively similar availability of resources and are therefore capable of implementing comparable corporate governance structures. Therefore, non-cartel firms are considered similar in size to cartel firms if the net sales are within **±25%** of the cartel firms' sales for the year before the cartel cases started. Possible matches for cartel firms are identified through customised search. Excel spreadsheets are used to collate the data furnished from each search, which are then sorted and assessed to identify the closest possible matches. This variable is also used as a control variable in the regression model to control for firm profitability.

However, the classification of non-cartel firms will result in some misclassifications if a firm classified as non-cartel had an incidence of collusion or financial fraud. To reduce this possibility, the annual reports for the selected firms are reviewed, as well as data from Department of Justice, European Commission and Competition Commission (three years pre-cartel detection); to verify that there are no documented reports of cartel for any non-cartel firms. The financial statements filed with the U.S Securities and Exchange Commission (SEC) are also reviewed to identify whether the firms committed any financial fraud during the same window period for each cartel case. In the case that fraud was committed; the matched firm is excluded from the sample. From this step most excluded firms were identified in the 1901 initial cartel firms sample; in other words, they have been in a cartel before.

Finally, after firms had been identified and checked; each cartel firm is matched with one or more non-cartel firms depending on the availability of data. There are three scenarios:

- **One cartel firm is matched with one non-cartel firm**. This is the case if only one firm matched the requirements. In this case, there are **130** non-cartel firms. For example, the cartel firm Alliance Boots LTD is matched with non-cartel firm AAH Pharmaceuticals LTD.

- **One cartel firm is matched with more than one (two or more) non-cartel firms**. This is the case if the cartel firm has more than one match: In this case, all possible matches are included. There are a total of **30** non-cartel firms in this category. For example, the cartel firm Prosper de Mulder LTD is matched with non-cartel firms Butcher's Pet Care Limited and Crown Pets' Foods LTD.
- **More than one cartel firms are matched with the same non-cartel firm**. In this case, there are **18** non-cartel firms that are matched with 50 cartel firms. For example, Morrison Foods and Waitrose are matched with non-cartel firm Marks and Spencer.

The total benchmark after the matching process completed is **178** non-cartel firms, taking into account all possible matches for each cartel firm (The table for matching cartel firms with non-cartel firms can be found in Appendix **A3**).

4.4 Benchmark Descriptive Analysis

As discussed earlier, the total number of non-cartel firms identified is 178. The sample contains data collected for firms located across multiple countries. The descriptive analysis for non-cartel firms is categorised as follows:

4.4.1 Country of Origin

Table 4.9 below represents the number of non-cartel firms according to their country of origin. The firms with the most number are from the UK (138 firms), followed by Ireland (13 firms) and the U.S. (8 firms).

Table 4.9: Number of Non- Cartel Firms According to Their Country of Origin

Country	Cartel firms	Non- cartel firms
Australia	1	4
Canada	2	0
China	0	4
France	8	3
Germany	5	0
Ireland	2	13
Italy	1	5
Japan	1	1
Netherlands	2	2
New Zealand	1	0
Singapore	3	0
Spain	1	0
UK	114	138
US	9	8
Total	**150**	**178**

Source: Author's own calculation

4.4.2 Industry

The table below shows the matched industries of non-cartel firms with cartel firms. The industries of non-cartel firms are classified using the same three-digit SIC industry code for each cartel firm for 24 industries. The table below shows the major industries of cartel firms and non-cartel firms. Those firms with the most number are from the chemical industry (36 firms), followed by those that deal with wholesale of food, beverages, and tobaccos (16 firms).

Table 4.10: Industry Cartel Firms vs. Non-Cartel Firms

SIC	Industries	Non-cartel firms	Cartel firms
133	Finishing of textiles	12	13
182	Reproduction of recorded media	4	4
192	Manufacture of refined petroleum products	7	4
201	Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms	36	24
211	Manufacture of basic pharmaceutical products	6	6
236	Manufacture of articles of concrete, cement and plaster	5	5
241	Manufacture of basic iron and steel and of Ferro-alloys	4	4
244	Manufacture of basic precious and other non-ferrous metals	6	6
279	Manufacture of other electrical equipment	2	1
324	Manufacture of games and toys	3	3
325	Manufacture of medical and dental instruments and supplies	4	2
352	Manufacture of gas; distribution of gaseous fuels through mains	13	13
432	Electrical, plumbing and other construction installation activities	3	3
451	Sale of motor vehicles	15	14
463	Wholesale of food, beverages and tobacco	16	13
464	Wholesale of household goods	4	4
477	Retail sale of other goods in specialised stores	1	1
493	Other passenger land transport	5	1
511	Passenger air transport	13	10
551	Hotels and similar accommodation	1	1
612	Wireless telecommunications activities	11	11
651	Insurance	3	3
692	Accounting, bookkeeping and auditing activities; tax consultancy	4	4
	Total	**178**	**150**

Source: Firms House

4.4.3 Ownership Type

There are more private firms than public firms in the sample (66% private vs. 34% public non-cartel firms). Table 4.11 below shows the type of ownership across cartel firms and non-cartel firms alongside their country of origin. The highest distributed firms (both public and private) in the sample are from the UK (103 private firms vs. 35 public firms) followed by Ireland (11 privately-owned firms), and Italy (7 publicly-quoted firms).

Table 4.11: Non-Cartel Firm Ownership Type against Their Countries of Origin

	Non-cartel firms		Cartel firms	
Countries	**Private**	**Public**	**Private**	**Public**
Australia	3	1	1	0
Canada	0	0	0	2
China	0	3	0	0
France	0	2	3	5
Germany	0	0	5	0
Ireland	11	5	2	0
Italy	0	7	1	0
Japan	0	1	0	3
Netherlands	1	1	0	2
New Zealand	0	0	1	0
Singapore	0	0	1	1
Spain	0	0	0	1
UK	103	35	44	70
US	3	2	4	4
Total	121	57	62	88

Source: Author's own calculation

4.5 Chapter Summary

This chapter provides a description of data sources and data collection method for this study. The data sources involve a set of firms that have been detected for cartel activities, including those found to have participated in cartels and sentenced by the U.S. Department of Justice, the EC, and CC/OFT. Certain difficulties pertaining to lack of availability of data due to lack of transparency of cases were encountered for data collection. A screening process was conducted, which eventually led to the acquisition of a full list of 150 cartel firms, which are divided into single abusers and multiple abusers (Recidivism). When counting the multiple cartel firms, this number became 121 only. The total number of non-cartel firms, on the other hand, is 178.

The UK cartel firms are the focus of this study since these firms have the most significant number of cartel firms amongst the included countries of origin.

Cartel cases are described according to the country of origin, industry, and cartel duration. Cartel firms, on the other hand, are described according to the country of origin, industry, and type of ownership. A matched sample (non-probability) approach is utilised to create a comparison group, aiming to limit variations that might potentially cause bias and determine that some characteristics are identical. A three-digit Standard Industry Code (SIC) is used for the industry selection for the matching process. The size criterion is utilised to ensure that both cartel firms and non-cartel firms are similarly related in terms of availability of resources and are thus capable of enforcing comparable corporate governance structures. Financial statements filed with the U.S. SEC are reviewed to ascertain any financial fraud committed by the firms during the same window period for each cartel case. This chapter describes specific scenarios in its pursuit to match each cartel firm with one or more non-cartel firms based on data availability.

The next chapter ushers the reader to the methodology and empirical results, which is a continuance from this chapter, whereby outlined propositions are described, alongside measurement of the dependent variable, independent variables, and control variables.

Chapter Five

Methodology and Empirical Results

This chapter aims to provide an empirical answer to the primary research question:

Is there any relationship between corporate governance attributes and the incidence of cartel formation?

The chapter presents and discusses the results from the research using the assembled data. It opens with the methodology for selecting and measuring the independent variables, which are described in more detail. These independent variables are constructed from board characteristics, ownership structure and CEO characteristics (outlined in Chapter three) most likely relevant to cartel formation and discovery. Six board, two ownership and eight CEO variables are described. Since collusion depends on three environmental factors, the market environment, legal and regulatory environment, and then the internal control environment, these must also be modelled (Bolotova *et al*., 2005).

In this study, the internal control environment is focussed on board characteristics and not board decisions or activities. The model is a static model of board and CEO characteristics. Therefore, market and legal indices are used as control factors shared between cartel and non-cartel firms. Since the firms in the cartel and non-cartel sets have been matched, then cross-comparison between them controlling for other environmental factors shall concentrate the focus of the analysis on board and CEO characteristics.

Descriptive statistics and correlation analysis are followed by the presentation of the results of the tested models and the inferences drawn from tests of the propositions. Findings are compared with prior research and differences are explained.

5.1 Outline of Propositions

5.1.1 Measurement of the Dependent Variable

Using data records from the period 1990 to 2008 of cartel activity and sanctions on firms from European Commission (EC), the UK Competition Commission (CC) / Office of Fair Trading (OFT) and U.S Department of Justice (DoJ) two variables were created to measure cartel formation and discovery:

1. The discrete variable Convictions (**CONV**) are created to imply the **formation and discovery** of cartel. Hence, the dependent variable separates those firms that formed cartels that were detected from all other firms some of which were not in cartels and other which were in cartel but were not discovered. **The dependent variable Conviction (CONV)** counts the number of episodes of sanctions in connection with proven cartel activity. **CONV** takes a value of 1 if the firm has been sanctioned in connection with cartel formation and discovery on a single occasion, 2 if the firm was involved in cartel activity on two occasions (*multiple abusers*), etc. The value of 0 is assigned to **CONV** for the benchmark comparison with firms without any involvement in cartel activity, referred to here as "*non-cartel firms*", which means that the firm has not formed any cartel, nor had been discovered for any cartel activity. However, it must be noted that some non-cartel firms might also be in cartel but have not been discovered, which cannot qualify them to be called "*cartel firms"* in this study.

   The definition of **CONV** in the ordinal logistic model is that of an event with a certain probability, and this will be described in more detail further on in this chapter.

2. **The dependent variable Cartel** is a dummy variable of whether a firm participates in cartel agreement or not, which took a value of 1 if the firm participated and discovered in cartel agreement and 0 otherwise.

5.1.2 Measurement of the Independent Variables

The governance data and the financial data originated from proxy statements with filing dates three years prior to the start of the cartel agreements. The sources used to collect the data also include Fame, DataStream, UK Firms House, Annual Reports by respective firms, BoardsEx, and ExecuComp. In order to test whether certain characteristics of the boards and CEOs are associated

with cartel formation, the following variables are constructed to test the propositions made in chapter three:

- **Board Characteristics**

1. **Sizeba**, the size of the board pre-cartel formation. This variable is calculated as the average total number of executive and non-executive directors for three years before the cartel started for cartel firms. In the case of non-cartel firms, the average size is taken over the three-year period corresponding in time to the window on the cartel firm with which the non-cartel firm is matched.

2. **NED (%)**, the percentage non-executive directors on the board pre-cartel formation. This variable is computed for cartel firms as the percentage of the total number of board members who are considered to be an independent director for the three-year period before the cartel started. In the case of non-cartel firms, the average is taken over the three-year period corresponding in time to the window on the cartel firm with which the non-cartel firm is matched.

3. **Ageba**, the age of the board pre- cartel formation. This variable is calculated as the average age of the board for three years before the cartel started for cartel firms. In the case of non-cartel firms, the average age is taken over the three-year period corresponding in time to the window on the cartel firm with which the non-cartel firm is matched.

4. **GENBA (%)**, the average gender ratio of the board pre-cartel formation. This variable is computed for cartel firms as the ratio of the number of female directors on the board to the total number of male directors for the three-year period before the cartel started. In the case of non-cartel firms, the average gender is taken over the three-year period corresponding in time to the window on the cartel firm with which the non-cartel firm is matched.

5. **Durba**, the duration of the board pre-cartel formation. This variable is computed for cartel firms as the average duration of the board for three years before the cartel started. In the case of non-cartel firms, the average duration is taken over the three-year period corresponding in time to the window on the cartel firm with which the non-cartel firm is matched.

6. **Remun,** the board remuneration pre- cartel formation. This variable is computed for cartel firms as the average board compensation for the three-year period before the cartel started. In the case of non-cartel firms, the average is taken over the three-year period corresponding in time to the window on the cartel firm with which the non-cartel firm is matched.

- **Ownership Structure**

1. **OUTOWN (%),** the common stock owned by outside directors on the board pre-cartel formation. This variable is calculated for cartel firms as the percentage of the common stock owned by outside directors for the three years before the cartel started. In the case of non-cartel firms, the average is taken over the three-year period corresponding in time to the window on the cartel firm with which the non-cartel firm is matched.

2. **FAMCON,** following Lin and Liu (2009) FAMCON is a dummy variable, which equals 1 if the firm is family-owned and controlled, 0 otherwise.

- **CEO characteristics**

1. **CEOAGE,** CEO age. This variable is computed as the age of the CEO at the starting year of the cartel formation. In the case of non-cartel firms, the CEO age is taken over the period corresponding in time to the window on the cartel firm with which the non-cartel firm is matched.

2. **CEOTEN,** CEO tenure. This variable is computed as uninterrupted years on the board of directors up to the year when the cartel started. In the case of non-cartel firms, the CEO tenure is taken over the three-year period corresponding in time to the window on the cartel firm with which the non-cartel firm is matched.

3. **CEOGEN,** CEO gender. This variable is a dummy variable for both cartel firms and non-cartel firms with value of 1 if CEO was female and 0 if otherwise. In the case of non-cartel firms, the CEO gender dummy is taken over the three-year period corresponding in time to the window on the cartel firm with which the non-cartel firm is matched.

4. **BOSS,** power concentration. This variable is a dummy variable for cartel firms created with a value of 1 if the chair of the board held concentration power of CEO or president and 0 if otherwise. In the case of non-cartel firms we take the BOSS dummy is taken over the three year period corresponding in time to the window on the cartel firm with which the non-cartel firm is matched.

5. **Multidir**, multiple-directorships. This variable is calculated as the total number of directorship assigned to the CEO on other boards. In the case of non-cartel firms, the total number of multiple directorships is taken over the three-year period corresponding in time to the window on the cartel firm with which the non-cartel firm is matched.

- **CEO Compensation**

1. **Bonus.** This variable is calculated as the average three-year CEO bonus. In the case of non-cartel firms, we take the average CEO bonus over the same time window which corresponds in time with the window of the cartel firm with which the non-cartel firm is matched.

2. **Shares.** This variable is calculated as the average three-year CEO shares in the firm. In the case of non-cartel firms, we take the average CEO shares over the three-year period corresponding in time to the window on the cartel firm with which the non-cartel firm is matched.

3. **Tcomp.** Is the total compensation. This variable is calculated as the total average three years CEO compensation in the firm. In the case of non-cartel firms, the average CEO total compensation is taken over the three-year period corresponding in time to the window on the cartel firm with which the non-cartel firm is matched.

5.1.3 Measurement of Control Variables

In the empirical analysis of price fluctuations, Connor *et al*., (2008) suggest that the success of collusion depends on three key factors: market environment, legal environment, and internal enforcement. Since this study examines the governance structure of firms involved in cartel, this study will examine independent governance variables (CEO and board characteristics) in respect to cartel formation and discovery (**CONV** scores), and therefore, following Connor *et al.* (2008) will

establish some measures for control factors that describe the market and legal environments of cartel and non-cartel firms, as well as the firm control variables.

- **The Market Environment**

HHI, i.e., the Herfindahl-Hirschman Index, commonly accepted measure of the market concentration is used in this study. It is calculated by squaring the market share of each firm competing in the market and then summing up the resulting numbers.

$$H = \sum_{i=1}^{N} s_i^2$$

Where s_i is the market share of the firm; i is the market, and N is the number of firms. In a market with two firms each with 50 percent market share, the HHI equals 0.50^2 + 0.50^2 = 1/2. Markets in which the HHI is between 0.15 and 0.25 point are considered moderately concentrated by the U.S DoJ, whilst those in which the HHI is in excess of 0.25 are considered to be concentrated. Transactions that increase the HHI by more than 0.1 in already concentrated markets will automatically attract antitrust concerns under the Horizontal Merger Guidelines, issued by the U.S DoJ and the Federal Trade Commission (FTC) (See Merger Guidelines (1.5)). In the case of non-cartel firms, we take the HHI over the same time window, which corresponds in time with the window of the cartel firm with which the non-cartel firm is matched.

- **The Legal Environment**

This variable describes the jurisdictional zone where the conviction case was set. The variable is broken out into an array of four jurisdictions, covering the U.S Department of Justice (DoJ), the Competition Commission/ Office of Fair Trading (OFT), the European Commission (EC), and all other territories. A value of 1 is assigned when the firm is found to have committed a cartel criminal infringement in the jurisdiction, and 0 if otherwise. However, as these variables are highly correlated with one another only the DoJ variable is used in the regression since it is the oldest jurisdiction between all and it is not highly correlated with the other variables.

- **Firm Control Variables**

1. **Saleb**, i.e., the average sales pre-cartel formation; this variable is calculated for cartel firms as the average size of the board for three years before the cartel agreement started. In the case of

non-cartel firms, we take the average sales over the three -year period corresponding in time to the window on the cartel firm with which the non-cartel firm is matched. It must be noted that the firms, having the most number of firms amongst the sample firms, are highlighted in the sample.

2. **CurrRatioB**, i.e., the average of current ratio pre-cartel formation. This variable is calculated as the average of current asset divided by current liabilities for three years before the cartel started. In the case of non-cartel firms, the average current ratio is taken over the three-year period corresponding in time to the window on the cartel firm with which the non-cartel firm is matched.

3. **PPER**, i.e., the average poor financial performance pre-cartel formation. Bell, Szykowny, and Willingham (1993) noted that poor financial performance increases the likelihood of general financial fraud. Therefore, the variable **PPER** (poor performance) is included as a metric to control for differences in financial performance between cartel and non-cartel firms. The metric is measured in a manner similar to that of DeAngelo and DeAngelo (1990), DeAngelo, DeAngelo, and Skinner (1994), and Beasley (1996). However, the studies above have used a poor performance measure as a dummy variable, whereas here, the actual value of 'poor performance' is used to indicate the firms' actual financial performance. The variable is calculated for cartel firms as the average profit and loss for three years before the cartel started. In the case of non-cartel firms, the average is taken over the three-year period corresponding in time to the window on the cartel firm with which the non-cartel firm is matched.

4. **COSTA**, i.e., the firm's ownership status to control for private firms and public firms. This variable takes the value of 1 if the firm is public and 0 if the firm is private.
5. **Industry,** i.e. the industry in which each firm operates (three-digit SIC code);
6. **Year,** i.e. the starting year of the cartel formation agreement.
7. **Country (UK),** a dummy variable took value of 1 if the firm based in the UK, 0 otherwise.

Table: 5.1 Variables and their Measurements

Dependent variable	Symbol	Description of the Variables
Cartel formation and discovery (conviction)	CONV	Ordered variable equal to the prior incidence of cartel formation and discovery. Thus, the value is 0 if the firm had never been convicted of a cartel crime, 1 if it was a first-time conviction, 2 if it represented the second conviction, and so on.
Cartel formation	Cartel	Dummy variable which equal 1 if the firm participated and discovered in cartel agreement and 0 otherwise.
Independent Variables		
Board Characteristics		
Size of the Board	SizeBA	Average size of the board of directors for the period pre-cartel, for both cartel and non-cartel firms.
Age of the Board	AgeBA	Average age of the board of directors for the period pre-cartel, for both cartel and non-cartel firms.
Gender of the Board	GENBA %	The average gender ratio of the board of directors for the period pre-cartel, for both cartel and non-cartel firms.
Duration of the Board	DurBA	Average duration (years) of board members' tenure for the period pre-cartel, for both cartel and non-cartel firms.
Non-Executive Directors	NED %	Percentage of outsider (non executive) directors on the board for the period pre-cartel.
Board compensation	Remun	Average of three years board compensation
Ownership Structure		
Common stock own by outside directors	OUTOWN %	Proportion of common stock owned by outside directors.
Family-owned and controlled	FAMCON	Dummy variable, which equals 1 if the firm is family -owned and controlled, 0 otherwise.
CEO Characteristics		
CEO Gender	CEOGen	Dummy variable with a value of 1 if the CEO was female, 0 otherwise.
CEO Age	CEOAge	Age of the CEO at the starting year of the cartel.
CEO Tenure	CEOTen	Years of tenure for the CEO on the board.
Concentration Power	BOSS	Dummy variable with a value of 1 if the chair of the board also held the concentration power of CEO or president for the period pre-cartel.
Multi-directorship	Multidir	The total numbers of directorship the CEO serving on.
CEO Compensation		
Bonus	Bonus	Average 3 year CEO bonus for the period pre-cartel
Share	Shares	Average 3 year CEO share for the period pre-cartel
Total Compensation	Tcomp	Average 3 years total CEO compensation for the period pre-cartel
Control Variables		
Sale Pre-cartel	Saleb	Average 3 years sales for the period pre-cartel.
Current Ratio Pre-cartel	Currratio	Average 3 years current ratio (current assets/current liabilities) for the period pre-cartel.
Herfindahl Index	HHI	The size and distribution of the firms in a market pre-cartel
Poor Financial Performance	PPER	Average of three annual net losses in period preceding the cartel.
Firm ownership	Costa	Dummy variable with a value of 1 if the firm is a public firm and 0 if the firm is private.
Members Joined	Join	Number of members appointed during the CEO regime.
Department of Justice	DoJ	A dummy variable with value of 1 is assigned when the firm is found to have committed a cartel criminal infringement in the US, otherwise 0.
CEO Case	CEOCASE	Dummy variable shows the total number of cartel cases the CEO was involved in before a-particular cartel case.
CEO number	CEONUM	Total number of cartel cases the CEO is involved in.

5.2 Empirical Methodology

Bolotova, Connor, and Miller (2005) conducted an empirical study that used extensions of traditional autoregressive conditional heteroskedasticity (ARCH) models and generalised ARCH (GARCH) models. ARCH models take a time series of events and assume that the variance in the current error term is a function of previous error terms and often the sum of squares of previous terms. The empirical method used consistently measures price variation changes (the second order derivative) from cartel activity. The model could be used by antitrust authorities for the purpose of screening any illegal firm conduct that is alleged by other parties, and to prove additional information to summarise the fact of injury in any legal proceedings over price-fixing.

However, the model used here could complement other empirical (price or econometric) techniques, if it is established that board and CEO characteristics are significantly associated with cartel formation and discovery, once other environmental variables are controlled. The fact of the analysis being conducted before the formation, duration and discovery of a cartel could usefully use the same time period and empirical techniques to add further complexity and accuracy to establishing the likelihood of collusion. The possibility of adding scores in a logistic regression model is a great advantage of the model used in this study (*see below*).

To test for characteristics of the cartel firms, the ordered logit estimation analysis is used to examine differences in board and CEO characteristics between cartel and non- cartel firms. The ordered logit model is an estimation model that is employed for dependent variables that are measured using the ordinal scale rather than a nominal scale.

Ordered logistical regression is an extension of regression techniques that ordinarily use continuous variables. In logistical estimation, the response values can be discrete, and often are binary or called dichotomous variables (Stone and Rasp 1991). These types of analyses are suited to binary answers to questions; with 1 and 0 often substituting YES and NO categorical variables, or where the data should be normalised. If p is the probability of a 1, then the analysis relates p to the values of the explanatory variables; in this case board and CEO characteristics, which can be labelled x_0, x_1, x_2. However, writing $p = \beta\, x_0 + \beta_1\, x_1 + \beta_2\, x_2$ is not correct since the right hand side is not constrained to lie in the interval [0, 1], as it should if p is to represent some probability. The solution is to use the logit link function given by:

$$\ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 x_1 + \cdots + \beta_k x_k$$

(Equation 1)

And this produces the equations:

$$\frac{p}{1-p} = \exp\{\beta_0 + \beta_1 x_1 + \cdots + \beta_k x_k\}$$

(Equation 2)

And

$$p = \frac{\exp\{\beta_0 + \beta_1 x_1 + \cdots + \beta_k x_k\}}{1 + \exp\{\beta_0 + \beta_1 x_1 + \cdots + \beta_k x_k\}}$$

(Equation 3)

For the respective odds p/ (1 − p) and probability p. The right-hand side of the equation for p will now always lie in the interval [0, 1]. The left hand side of equation 1 is referred to as the 'logit', and equation 1 is the main object of interest in logistic regression.

Logistic regression is based on an ordinary regression relation, but not between continuous variables and explanatory variables. Instead, logistic regression relates the log of the odd p of the event occurring at a particular setting of the explanatory variables, and the values of the explanatory variables x1. . . xk . The quantity log (p/ (1 − p)) is also referred to as 'log odds'.
The procedure for estimating the coefficients β0, β1,..., βk using this relation and carrying out tests of significance on these values is known as logistic regression.

The definition of **CONV** in the ordinal logistic model is that of an event with a certain probability. In ordinal logistic regression, the particular event of interest is observing a particular score *or less*, in an ordered set of responses. For the example of convictions, the model would exercise the following patterns:

θ_1 = prob (CONV = 1) / prob (CONV greater than 1)
θ_2 = prob (CONV of 1 or 2) / prob (CONV greater than 2)
θ_3 = prob (CONV of 1, 2, or 3) / prob (CONV greater than 3)

The series of probabilities goes up until the last category (θ_j), which does not or cannot have an indeterminate odds associated, since at this point the probability of CONV reaching up to and including the last CONV score is a probability of 1.

All of the probabilities or log odds are of the form:

θj = prob (CONV $\leq$ j) / prob (CONV > j)

Or else, the equation can be re-written as

θj =prob (CONV $\leq$j) / (1–prob (CONV $\leq$j)).

Compare this to the left-hand side of equation 1. The probability of a firm with a CONV greater than j, is 1 – probability of a firm with CONV less than or equal to j.

The odds that an event occurs (in our case it will be the number of convictions – **cartel formation and discovery** – denoted by **CONV**) is the ratio of the number of firms who are found participating in a cartel, and are convicted, on a precise number of occasions, compared to the number of firms who do participate in a lesser number of cartel and are convicted. Hence **CONV**=2 is the logit divides the probability p that cartel participation occurs by the probability that cartel participation occurs at a lesser frequency. As both probabilities possess the same denominator and this cancels, the logit produces the number of cartel firms (with a certain number of discovery specified by **CONV**), divided by the number of non-cartel or cartel firms of lesser convictions (those firms with less than that number of convictions). Therefore, each **CONV** is a monotonic (probability) function rising in the interval [0, 1].

The coefficients in the logistic regression model used in this study yield how much the logit will change given certain values of the predictor variables. Therefore, the coefficients in the logistic regression model yield how much the ratio of cartel participation to non-cartel participation change, dependent on the characteristics of the CEO and board.

In ordinary logistic regression, the values of **CONV** would be dichotomous, or either 0 or 1. In ordered logistic regression, an order set of discrete variable can be assembled and the same regression procedure extended.

The fitted model includes a logit function for the number of response categories minus one (the reference event is number of cartel formation and discovery). For example, if the response has 4 levels, the model calculates 3 logit equations.

The ordinal logistic model in the simplest case, of a single independent variable, is then:

$\text{Log}\,(\theta j) = \alpha_j - \beta X$

Where j spans 1 to the number of categories, minus 1.

It is crucial to note that there may be a negative sign in front of coefficients for the predictor variables (board and CEO characteristics) instead of the usual positive signs in ordinary regression analyses. That is correct because in this model (versus ordinary regression models where the coefficient is reciprocal to the score or influence of a characteristic, and the right hand side of the regression model is not constrained to [0,1]), larger coefficients then indicate an association with larger scores or large influence.

This is easy to see since in the case that the numerator (probability p in the left hand side of equation 1) is less of a value than the denominator (probability of not-p, or 1-p in the left hand side of equation 1), the value of the log function will be negative since the log of a number less than 1 is always negative. The less likely p is compared to non-p or 1-p, the greater the negative value of the log and the more a larger negative co-efficient of a certain characteristic is required, or else many negative characteristics are required.

A large positive coefficient for a dichotomous variable model (for instance if cartel formation and discovery **(CONV)**, are either zero or one), would suggest that higher scores are more likely for the first category, i.e. the event that there are many more zero convictions, **CONV**=0, and thus a higher score for no conviction, meaning in our case that the non-cartel firms dominate the population of firms for that particular combination of CEO and board characteristics.

A negative coefficient indicates that lower scores are more likely. For a continuous variable, a positive coefficient tells you that as the values of the variable increase, the likelihood of larger scores increases. An association with higher scores (such as **CONV**=4) means smaller cumulative probabilities for lower scores, since they are less likely to occur.

Each logit has its own αj term, but possesses the same coefficient β. This means that the effect of the independent variable (CEO or board characteristic) is the same for different logit functions (which are calculating the relative probabilities of a certain number of convictions, and less than that number of convictions). Hence ordered logit regression models can be called the proportional odds model.

The αj terms are labelled threshold values and do not concern us here – they resemble the intercept of ordinary linear regression models – except that in ordered logistic regression, each logit has its own αj term. Therefore, αj is important for calculating the overall ordered regression solution, but each αj has no dependence on each of the independent variables, meaning board and CEO characteristics. The values of αj would be important for calculating predicted values, and if the model for instance was used in a machine learning environment, with the data such as here used as a training set, and then the model used on new data entirely (the test set) to predict the **CONV** rate that might be expected from amongst the mixed set of firms in the test set. The test set would thus be divided into cartel and non-cartel firms, and a value of **CONV** attached to each.

Each equation will possess a unique constant and a unique parameter for each predictor, meaning for each of the board and CEO characteristics. While nominal logistic regression assumes that the effect of the predictor characteristic differs for each response value in **CONV**, in ordinal logistic regression the effect is assumed to be constant (to repeat, a constant coefficient β in each logit function). Each logit function evaluates how the covariates affect the likelihood of observing the reference level of the response, versus observing another level of the response. The slope for each covariate describes how the likelihood is affected. This means that all of the values of the coefficients of characteristics in Table 5.2 (below) are correct for all of the values of **CONV**. If a multinomial logit regression were used, there would be many more tables of coefficients, up to the value of j-1, in the description above.

Three other attractive features of ordered logistic modelling are noticeable. First, there is how combining scores into a single category does not affect results in other groups not involved in the merge. The linear quality of the model is thus quite intuitive even to non-experts. This is very desirable for allowing a business people and other non-mathematicians to appreciate the results.
At the same time, and secondly, the ordinary logistic regression model does not assume any particular probability distribution around the distribution of the independent variables. This also is crucial for describing the ‘real’ distribution of characteristics in a human population i.e. board members and CEOs, whose age, gender, and other features is not easy to ascribe an analytic probability distribution. For instance, most board members are male and between the ages of 40-70, with highly skewed populations of men and older men. The probability distribution does not have to be normal, linear or of equal variance amongst the sets of independent variables. All of this

permissible variation makes the model capable of being applied to the particular population and other characteristics of corporate firms.

Third, a Maddala (1991) show that the logit model analysis is the appropriate procedure where disproportionate sampling from two populations (i.e., the cartel and non-cartel firm populations) occurs. Maddala notes that, the "coefficients of the explanatory variables are not affected by the unequal sampling rates from the two groups. It is only the constant term that is affected." Therefore only the values of α_j are affected. Two comments can be made here. In the sample in this study, because of the very careful matching process done between cartel and non-cartel firms, and the selection of roughly equal numbers of cartel versus non-cartel firms, the distribution of convictions (cartel formation and discovery) and non-convictions in terms of sample records would already be approximately 1 (given a dichotomous **CONV** = 0 or 1). However, the allowable range of **CONV** is much higher in the ordered logistic regression, and so this still does not affect the model.

Moreover, if the sample of firms had been highly biased towards non-cartel firms (as in real life, when cartel firms are in a minority), and then this is of little consequence. It might appear that a sample of 1500 non-cartel firms versus 150 cartel firms would bias the model towards non-cartel firms, or negative values in the logit function, since the population of the event in the denominator is much larger than the population in the numerator. The latter possibility seems easy to appreciate, since in the case that the numerator (probability p in the left hand side of equation 1) is less of a value than the denominator (probability of non-p, or 1-p in the left hand side of equation 1), the value of the log function will be negative since the log of a number less than 1 is always negative. The less likely p is compared to non-p or 1-p, the greater the negative value of the log and the more a larger negative co-efficient of a certain characteristic is required, or else many negative characteristics are required. However, logit function works by probabilities and is not dependent on the sample size of either p or non-p, meaning cartel or non-cartel firms.

This is another benefit of the model, its extensibility to unequal populations of cartel and non-cartel firms. Therefore, the logistic regression model described here, if used elsewhere on a 'real' population, is still valid and should have predictive power. The single matter then in empirical terms would be to adjust the values of αj, as Maddala (1991) makes note. Correcting for any bias appearing in the constant term αj, is only important if the logit analysis is being used to obtain parameter estimates for purposes of developing a predictive model (Palepu 1986). It is not the purpose of this

research to develop a predictive model of cartel formation related to CEO and board characteristics. The model could be only be used accurately to predict cartel and non-cartel firms amongst a population that was already known to contain, like this sample, an overall roughly equal sampling of cartel and non-cartel firms. Therefore, the model has limited predictive capacity in a real world scenario where the population of non-cartel firms is likely to be much higher, and then values of αj will be much different from the matched data used here. The values of αj are not necessary for this study, and so are not discussed.

5.3 Descriptive Statistics and Univariate Analysis

This section is divided in to three parts; the first part analyses the descriptive statistics for the entire 150 cartel firms and 178 non-cartel firms which are represented in table (5.2). The second part analyses the descriptive statistics for only the 114 UK- based cartel firms and 138 UK non-cartel firms which are represented in table (5.3). The last part in this section will analyses the descriptive statistics for the 56 UK cartel firms at home and 58 UK cartel firms abroad which are represented in table (5.4).

5.3.1 Descriptive Statistics Analysis for all Cartel and Non-Cartel Firms

It is essential to perform the univariate tests since many of the variables of interest were not normally distributed. Table 5.2 provides a summary of the descriptive statistics of cartel and non-cartel firms in respect of the board characteristics, ownership structure, CEO characteristics and CEO compensation package. The table shows the number of observations (Obs), the means, the standard deviation (STDV), and finally the p-value from paired t-tests between the means. All univariate test results are reported as two-tailed. The results presented in Table 5.2 below are ordered by the three categories of corporate governance used in this study and reported as significant at the 1%, 5% or 10% p-levels (denoted as ***,**, and * respectively)

Table 5.2: Statistical Description of Board and CEO Characteristics: Cartel Firms vs. Non-Cartel Firms, 1990-2008

The table reports a descriptive statistics of 150 cartel firms and 178 non-cartel firms. For every cartel firm, a control group of non-cartel firms was created, which share the first three digits of the SIC code and similar firm size based on net sale within ±25% of the cartel firm's sales at the end of the year before the collusive agreement started. Firm-years, in which cartel firms, i.e., firms that at one point in time during our sample period are part of a cartel agreement, are not participating in a cartel, are excluded from this analysis. *Sizeba* is the size of the board pre-cartel formation. *NED%* is the percentage non-executive directors on the board pre-cartel formation. *Ageba* is the age of the board pre-cartel formation. *GENBA %* is the average gender ratio of the board pre-cartel formation. *Durba* is the duration of the board pre-cartel formation. *Remun* is the average board remuneration pre-cartel formation. *OUTOWN %* is the common stock owned by outside directors on the board pre-cartel formation. *FAMCON* is a dummy variable, which equals 1 if the firm is family owned and controlled. *CEOAGE* is computed as the age of the CEO at the starting year of the cartel formation. *CEOTEN* is computed as uninterrupted years on the board of directors up to the year when the cartel started. *CEOGEN* is a dummy variable for both cartel firms and non-cartel firms with value of 1 if CEO was female and 0 if otherwise. *BOSS* is a dummy variable for cartel firms created with a value of 1 if the chair of the board held concentration power of CEO or president and 0 if otherwise. *Multidir* is calculated as the total number of directorship assigned to the CEO on other boards. *Bonus* is calculated as the average three-year CEO bonus. *Share* is calculated as the average three-year CEO shares in the firm. *Tcomp* is calculated as the total average three years CEO compensation in the firm. *HHI* is the Herfindahl-Hirschman Index. *DoJ* is a dummy variable with value of 1 is assigned when the firm is found to have committed a cartel criminal infringement in the jurisdiction. *Saleb* is the average sales pre-cartel formation. *CurrRatioB* is the average of current ratio pre-cartel formation. *PPER* is the average poor financial performance pre-cartel formation. *COSTA* is the firm's ownership status to control for private firms and public firms. *UK* is a dummy variable took value of 1 if the firm based in the UK, 0 otherwise. *JOIN* is the number of member joined the board during that period. The variables on board and CEO characteristics were obtained from proxy statements with filing dates three years prior to the cartel agreements started. The equality of means is tested using a standard *t*-test and the equality of medians using a Wilcoxon signed rank test. ***, **, * indicates statistical significance at the 1%, 5%, 10% level.

	Cartel-Firms			**Non-Cartel-Firms**			
Category	**Obs**	**Mean**	**STDV**	**Obs**	**Mean**	**STDV**	***t*-test (p-value)**
Independent Variable							
Boards Characteristics							
Sizeba	150	7.02	4.49	178	4.9	3.96	0.39
Durba	150	2.26	1.27	178	2.31	1.60	0.76
Ageba	150	44.5	8.81	178	44.9	12.1	0.80
GENBA (%)	150	0.05	0.14	178	0.11	0.20	0.00**
Ned (%)	150	0.05	0.15	178	0.08	0.14	0.09**
Remun	123	1.93	13.17	127	0.62	4.11	0.28
Ownership Structure							
Outown (%)	150	0.74	0.40	178	0.67	0.44	0.13
FAMCON	149	0.01	0.11	178	0.07	0.26	0.01**
CEO Characteristics							
CEO tenure	150	9.18	4.47	178	10.9	4.90	0.00**
CEO age	150	50.9	8.9	178	44.3	9.90	0.00**
CEO gender	150	0.01	0.08	178	0.19	0.39	0.00**
BOSS	150	0.47	0.50	178	0.20	0.40	0.00**
Multidirectorship	150	1.80	2.50	178	2.80	2.91	0.00**
CEO Compensation							
Bonus	46	22.0	44.62	46	6.10	10.3	0.02**
Share	46	9.39	19.05	46	0.40	1.21	0.00**
Tcomp	46	82.93	224.4	46	15.75	21.2	0.04**
Control Variables							
COSTA	150	0.59	0.49	178	0.32	0.46	0.00**
Saleba	148	0.48	4.79	173	0.14	0.44	0.35
PPER	139	-0.38	2.10	156	0.81	2.98	0.00**
CURRRATIOB	144	1.45	1.01	170	1.50	1.20	0.66
HHI	150	0.24	0.21	178	0.16	0.15	0.00**
UK	150	0.76	0.42	178	0.77	0.41	0.74
Join	150	5.48	5.92	177	5.80	5.40	0.58

Source: Author's own calculation

Mean and pairwise comparisons (cartel vs. non-cartel firms) for various characteristics of the board of directors and CEOs are in the table above. The matched pairs of the pairwise comparison varied from 46 to 178 depending on the availability of data.

The table 5.2 provides a statistical description of board and CEO characteristics: cartel firms vs. non-cartel firms, from the period 1990 to 2008. The average board size of cartel firms had 7 directors of whom 5% are non-executive directors and 5% were female directors. In comparison the average board size of non-cartel firms had 5 directors of whom 8% were non-executive and 11% female directors.

In one hand, the pairwise differences in board characteristics show that difference in average board size (**Sizeba**), average board duration (**Durba**), average board age, and average board remuneration (**Remun**) are not statistically different from zero. On the other hand, the percentage of female directors on the board (**GENBA %**) is statistically significantly higher for non-cartel firms than cartel firms. Hence, this result supports the proposition **P4**; the number of women directors on the board is negatively related to cartel formation and discovery. This has been emphasised in the study of Cheung *et al.* (2006) and Swamy *et al.* (1999) on the propensity of female directors to be less corrupt than men, which therefore led to an expectation to see less female serving on the board of cartel firms compare to non-cartel firms. This result also consistent with the study of Ford and Richardson, 1994; Watson and McNaughton, 2007 and Smith *et al.*, 2006; Huse and Solberg, 2006 who reports a positive effect of the role of women on boards and find that women improve the quality of decision making, and that women are generally more risk averse than men.

On average, cartel firms have lower percentage of non-executive (**NED%**) than non-cartel firms and the result support proposition **P2**; the percentage of independent (non-executive) members on the board of director is lower for firms committed cartel crime than for non-cartel firms. This is consistent with the findings of Fama (1980), Fama and Jensen (1983) and Duchin *et al.*, 2010, that a higher percentage of independent directors (non-executive) increase the board effectiveness as a monitor management.

The pairwise differences in ownership structure shows that there are more family-owned and controlled firms between non-cartel firms than cartel firms (**FAMCON)**. This result is contradictory to our proposition **P8,** that cartel likely to be formed by family-owned and controlled firms**.**

However, the result is consistent with Laiho (2011) who argued that a more effective monitoring takes place through a more concentrated ownership in the form of large shareholders.

The pairwise differences in CEO characteristics shows that cartel firms had significantly lower CEO tenure (**CEOten**)which support proposition **P10**, that the number of years a CEO had served as a director for a UK cartel firm is less than that for non-cartel firms. This result consistent with Han, (2010) results which shows that firms are more likely to be involved in cartel agreement when CEO tenure (short-term employment contract) is low or when CEO turnover (compensation) is high. Also this results support the finding by Kaplan and Minton (2008) who have argued that it is possible for CEOs with shorter tenure to pursue manipulation in the form of earnings management with the situation that provides greater stock performance sensitivity and higher compensation.

Moreover, the statistical comparison shows that CEO age (**CEOage**) for cartel firms is higher compared to non-cartel firms, and this finding supports our proposition **P9**: That the age of the CEO for cartel firms is higher than non-cartel firms ($p=0.00 <0.05$). This results consistent with Kensinger, (2012); Rezaee, (2007); Young and Buchholtz, (2002) and Hart, (1995) that experience is correlated with age and some firms tend to employ older CEOs for their experience, social network and knowledge in an industry. These qualities of older CEOs could facilitate the formation of cartel. In addition, CEO closer to retirement age might feel he has less to lose in reputation damage if caught committing cartel, and hence be more likely to perform cartel.

The t-test validity depends on the distributions of the means in the cartel and non-cartel firms being approximately normal. The approximate normal distribution condition was generally true, as noted in the first set of descriptive statistics above, except for the characteristic CEO gender (**CEOgen**) amongst cartel firms, which had a skewness of 12.25 and kurtosis of 150. However, given the fact that only one of 150 cartel firms and 35 of 178 non-cartel firms had a female CEO, the test for the difference in means would still be expected to yield a significant, statistical difference. The female CEO on cartel firms' boards is lower than for non-cartel firms; this also supports our proposition of **P11**: Less female CEOs represented in cartel firms compared to non-cartel firms ($p=0.00 <0.05$). This findings also support that of Bharat *et al.* (2009 cited in Berger *et al.*, 2012), where the author posited that due to being more risk averse, female CEOs tend to make poorer investment decisions and financial risks than male CEOs; hence, are likely to be less represented in cartel firms than in non-cartel firms.

In addition, lower number of multiple-directorships (**MULTIDIR**) appears in cartel boards compared to non-cartel boards. This result supports our proposition **P12** that boards of directors of a firm committing cartel are less likely to have directors who work on other boards than boards of directors of non-cartel firms ($p=0.01 <0.05$), with similar result in 1% and 10%. This is consistent with the work of Fama and Jensen (1983) that good governance practices are found in those directors who carry out multiple directorships and are part of more than one board; hence, better governance is associated with having directors who serve in more than one board, and this is contrary to cartel firms.

The statistics result also shows that there are more CEOs' role as president (**BOSS**) in cartel firms' boards than non-cartel firms, which supports our proposition **P13** that firms committing cartel crimes are more likely to have CEOs serving as board chairs compared to non-cartel firms ($p=0.00 <0.05$). This is consistent with the findings made by Goyal and Park (2002) that CEO concentration power is not encouraged and is even prohibited due to the likelihood of insider activities, e.g. cartel formation.

Table 5.2 present compensation incentive measures for the CEOs at each firm. Due to the availability of the data, the observation number shrunk to 92 firms (cartel and non-cartel). The results show that CEOs in cartel firms have higher average bonuses, higher percentage of shares and higher total compensation than non-cartel firms. In addition, the statistics also shows a significant p-value for the CEOs **bonuses**, **share**, and **total compensations** in cartel firms. This result supports our propositions **P14 (**The average CEO bonus for cartel firms is higher than non-cartel firms**), P15 (**The average CEO share for cartel firms is higher than non-cartel firms**),** and **P16** (Total CEO Compensation for cartel firms is higher than non-cartel firms). The results consistent with Spagnolo, (2000) that compensation packages enhance collusion.

A number of control variables were subject to univariate t-tests to determine whether additional firm and market characteristics not related to variations in corporate governance attributes were present between the sample of matched cartel and non-cartel firms. In one hand, the two-tailed comparison tests for three of the control variables - **SALE, CURRRATIOB,** and **JOIN** did not identify any statistically significant difference between the matched pairs.

On the other hand, the firm ownership variable (**COSTA**) shows a significant difference between cartel firms and non-cartel firms at a 5% p-value. This result confirms that public firms are more likely to engage in cartel agreement than private firms. Additionally, the poor performance (**PPER**) variable and the Herfindahl index (**HHI**) variable both demonstrate a significant difference between cartel firms and non-cartel firms at 5% p-value. Interestingly, the average poor financial performance for cartel firms is (-38.4) and the average for the non-cartel firm is (81.1).

Overall, the pairwise comparisons suggest that systematic differences between cartel firms and non-cartel matching firms are apparent in certain characteristics of the boards of directors and CEO characteristics. However, these univariate comparisons should be viewed with caution when making inferences about the connection between governance attributes and cartel formation. The pairwise tests implicitly assume that other potentially relevant firm characteristics are fixed, which may not be the case. Therefore, the ordered logit model was used to test the propositions in multivariate framework.

5.3.2 Descriptive Statistics of UK Cartel Firms and UK Non-Cartel firms

As discussed earlier in Chapter Four, the sample used in this study involved 150 cartel firms and 178 non-cartel firms from all around the world, of which 114 cartel firms and 138 non-cartel firms are from the UK. Therefore, since this study dominated by UK firms it is important to compare the behaviour of UK cartel firms and UK non-cartel firms. This comparison will provide a more broad inference on the characteristics of UK cartel and non-cartel firms within UK and outside.

Table 5.3 provides a summary of the descriptive statistics of UK cartel firms and UK non-cartel firms in respect of the board characteristics, CEO characteristics and CEO compensation package. The table shows the number of observations (Obs), the means, the standard deviation (STDV), and finally the p-value from paired t-tests between the means. All univariate test results are reported as two-tailed. The results presented in Table 5.3 below are ordered by the three categories of corporate governance used in this study and reported as significant at the 1%, 5% or 10% p-levels (denoted as ***,**, and * respectively).

Table 5.3 - Comparison between the Characteristics of UK Cartel Firms and UK Non-Cartel Firms

The table reports descriptive statistics comparison between 114 UK cartel firms and 138 UK non-cartel firms. *Sizeba* is the size of the board pre- cartel formation. *NED%* is the percentage non-executive directors on the board pre-cartel formation. *Ageba* is the age of the board before the cartel formation. *GENBA %* is the average gender ratio of the board pre-cartel formation. *Durba* is the duration of the board pre-cartel formation. *Remun* is the board remuneration pre- cartel formation. *OUTOWN %* is the common stock owned by outside directors on the board pre-cartel formation. *FAMCON is* a dichotomous variable, which equals 1 if the firm is family owned and controlled 0 otherwise. *CEOAGE* is computed as the age of the CEO at the starting year of the cartel formation. *CEOTEN* is computed as uninterrupted years on the board of directors up to the year when the cartel started. *CEOGEN* is a dummy variable for both cartel firms and non-cartel firms with value of 1 if CEO was female and 0 if otherwise. *BOSS* is a dummy variable for cartel firms created with a value of 1 if the chair of the board held concentration power of CEO or president and 0 if otherwise. *Multidir* is calculated as the total number of directorship assigned to the CEO on other boards. *Bonus* is calculated as the average three-year CEO bonus. *Share* is calculated as the average three-year CEO shares in the firm. *Tcomp* is calculated as the total average three years CEO compensation in the firm. *HHI* is the Herfindahl-Hirschman Index. *DoJ* is a dummy variable with value of 1 is assigned when the firm is found to have committed a cartel criminal infringement in the jurisdiction. *Saleb* is the average sales pre-cartel formation. *CurrRatioB* is the average of current ratio pre-cartel formation. *PPER* is the average poor financial performance pre-cartel formation. *COSTA* is the firm's ownership status to control for private firms and public firms. *UK* is a dummy variable took value of 1 if the firm based in the UK, 0 otherwise. *JOIN* is the number of member joined the board during that period. The variables on board and CEO characteristics were obtained from proxy statements with filing dates three years prior to the cartel agreements started. The equality of means is tested using a standard *t*-test and the equality of medians using a Wilcoxon signed rank test. ***, **, * indicates statistical significance at the 1%, 5%, 10% level.

	UK Cartel Firms			**UK Non-Cartel Firms**			
Category	**Obs**	**Mean**	**STDV**	**Obs**	**Mean**	**STDV**	***t*-test (p-value)**
Independent Variable							
Boards Characteristics							
Sizeba	114	5.61	3.68	135	5.09	3.51	0.26
Durba	114	2.09	1.07	134	2.44	1.51	0.04**
Ageba	114	44.72	8.09	134	47.23	8.74	0.02**
GENBA (%)	114	0.04	0.11	138	0.11	0.19	0.00**
Ned (%)	114	0.05	0.16	138	0.98	0.15	0.05**
Remun	92	0.31	1.55	92	0.12	0.17	0.25
Ownership Structure							
Outown (%)	114	0.76	0.40	138	0.67	0.44	0.08**
FAMCON	113	0.00	0.09	138	0.94	0.29	0.00**
CEO Characteristics							
CEO tenure	114	8.9	0.16	138	10.4	4.81	0.01**
CEO age	114	51.2	8.19	138	44.26	9.56	0.00**
CEO gender	114	0	0	138	0.16	0.37	0.00**
BOSS	114	0.43	0.49	138	0.26	0.44	0.00**
Multidirectorship	114	1.69	2.48	138	2.84	2.97	0.00**
CEO Compensation							
Bonus	38	14.8	17.2	33	7.41	1.19	0.03**
Share	38	7.64	14.8	33	6.42	13.9	0.00**
Tcomp	38	64.03	52.2	33	28.4	36.3	0.00**
Control Variables							
COSTA	114	0.61	0.48	138	0.25	0.43	0.00**
Saleba	112	6.23	55.15	135	1.05	2.00	0.27
PPER	104	-1.74	15.8	123	9.15	33.01	0.00**
CURRRATIOB	110	1.41	1.07	132	1.5	1.24	0.61
HHI	114	0.25	0.21	138	0.17	0.16	0.00**

Source: Author's own calculation

Mean and pairwise comparisons (UK cartel vs. UK non-cartel firms) for various characteristics of the board of directors and CEOs are in the table above. The matched pairs of the pairwise comparison varied from 38 to 138 depending on the availability of data.

In one hand, the pairwise differences in board characteristics show that difference in average board size, average board remuneration are not statistically different from zero. On the other hand, the average board duration (**Durba**) is statistically significantly longer for UK non-cartel firms than for UK cartel firms. This result suggest that the longer the duration of the board, the lower is the number of cartel formation, and thus the lower are the incentives to engage in cartel crime.

Besides, the average board age (**AGEBA**) is statistically significantly lower for UK cartel firms than for UK non-cartel firms. This result suggests that the lower the average age of the board the more likely that the firm will form a cartel.

Similar to the previous result gender diversity of the board (**GENBA** (%)), Family-owned and controlled firm (**FAMCON**) and non-executive directors (**NED** (%)) is statistically significantly higher for UK non-cartel firms than UK cartel firms. In addition, the percentage of common stock own by outside directors (**Outown** (%)) is statistically significantly higher for UK cartel firms than UK non-cartel firms.

Moreover, CEO characteristics; CEO tenure (**CEOten**) and CEO age (**CEOage**) demonstrate a significant difference, whilst the mean and standard deviation of 0 for CEO gender (**CEOgen**) for UK cartel firms indicates that there are no CEO female on UK cartel firms' boards. The pairwise difference shows that UK cartel firms had a significantly lower CEO tenure than non-cartel UK firms.

The CEO compensation package results show that CEOs in UK cartel firms have higher average **bonuses**, higher percentage of **shares** and higher **total compen**sation than UK non-cartel firms. In addition, the statistics also shows a significant p-value for the CEOs bonuses, share, and total compensations in UK cartel firms.

The firm ownership (**COSTA**) variable shows a significant difference between UK cartel firms and UK non-cartel firms at a 5% p-value. This result confirms that UK public firms are more likely to

engage in cartel agreement than UK private firms. Additionally, the poor performance (**PPER**) variable and the Herfindahl index (**HHI**) variable both demonstrate a significant difference between UK cartel firms and UK non-cartel firms at 5% p-value. Interestingly, the average poor financial performance for UK cartel firms is (-1.74) and the average for the UK non-cartel firm is (9.15).

Overall, the pairwise comparison between UK cartel firms and UK non-cartel firms shows very similar results to the comparison between cartel firms and non-cartel firms from the previous section.

5.3.3 Descriptive Statistics of UK Cartel Firms at Home and Abroad

As discussed earlier, the sample involved 114 UK cartel firms, of which 56 UK cartel firms found operating cartel in the UK (Home/Domestic) and 58 UK cartel firms found operating cartel abroad. Therefore, since this study dominated by UK firms it is important to compare the behaviour of UK cartel firms at home and abroad. This comparison will provide a more broad inference on the characteristics of UK cartel firms within UK and outside.

Table 5.4 provides a summary of the descriptive statistics of UK cartel firms at home and UK cartel firms abroad in respect of the board characteristics, CEO characteristics and CEO compensation package. The table shows the number of observations (Obs), the means, the standard deviation (STDV), and finally the p-value from paired t-tests between the means. All univariate test results are reported as two-tailed. The results presented in Table 5.4 below are ordered by the three categories of corporate governance used in this study and reported as significant at the 1%, 5% or 10% p-levels (denoted as ***,**, and * respectively)

Table 5.4 - Comparison between the Characteristics of UK Cartel Firms at Home and Abroad

The table reports descriptive statistics comparison between 56 UK cartel firms based at home and 58 UK cartel firms based abroad. The table reports descriptive statistics comparison between 56 UK cartel firms based at home and 58 UK cartel firms based abroad. *Sizeba* is the size of the board pre-cartel formation. *NED%* is the percentage non-executive directors on the board pre-cartel formation. *Ageba* is the age of the board before the cartel formation. *GENBA %* is the average gender ratio of the board pre-cartel formation. *Durba* is the duration of the board pre-cartel formation. *Remun* is the board remuneration pre- cartel formation. *OUTOWN %* is the common stock owned by outside directors on the board pre-cartel formation. *FAMCON* is a dummy variable, which equals 1 if the firm is family-owned and controlled 0 otherwise. *CEOAGE* is computed as the age of the CEO at the starting year of the cartel formation. *CEOTEN* is computed as uninterrupted years on the board of directors up to the year when the cartel started. *CEOGEN* is a dummy variable for both cartel firms and non-cartel firms with value of 1 if CEO was female and 0 if otherwise. *BOSS* is a dummy variable for cartel firms created with a value of 1 if the chair of the board held concentration power of CEO or president and 0 if otherwise. *Multidir* is calculated as the total number of directorship assigned to the CEO on other boards. *Bonus* is calculated as the average three-year CEO bonus. *Share* is calculated as the average three-year CEO shares in the firm. *Tcomp* is calculated as the total average three years CEO compensation in the firm. *HHI* is the Herfindahl-Hirschman Index. *DoJ* is a dummy variable with value of 1 is assigned when the firm is found to have committed a cartel criminal infringement in the jurisdiction. *Saleb* is the average sales pre-cartel formation. *CurrRatioB* is the average of current ratio pre-cartel formation. *PPER* is the average poor financial performance pre-cartel formation. *COSTA* is the firm's ownership status to control for private firms and public firms. *UK* is a dummy variable took value of 1 if the firm based in the UK, 0 otherwise. *JOIN* is the number of member joined the board during that period. The variables on board and CEO characteristics were obtained from proxy statements with filing dates three years prior to the cartel agreements started. The equality of means is tested using a standard *t*-test and the equality of medians using a Wilcoxon signed rank test. ***, **, * indicates statistical significance at the 1%, 5%, 10% level.

	UK Cartel Firms-Home			**UK Cartel Firms-Abroad**			
Category	**Obs**	**Mean**	**STDV**	**Obs**	**Mean**	**STDV**	***t*-test (p-value)**
Independent Variable							
Boards Characteristics							
Sizeba	56	6.43	3.68	58	4.78	3.52	0.01**
Durba	56	2.44	1.08	58	1.76	0.96	0.00**
Ageba	56	43.8	7.09	58	45.5	8.92	0.24
GENBA (%)	56	0.05	0.10	58	0.04	0.12	0.69
NED (%)	56	0.29	0.10	58	0.08	0.19	0.05**
Remun	45	0.13	0.24	47	0.47	2.15	0.29
Ownership structure							
Outown (%)	56	0.81	0.37	58	0.72	0.42	0.32
FAMCON	11	0.00	0.00	22	0.04	0.21	0.48
CEO Characteristics							
CEOten	56	10.03	4.02	58	7.86	4.49	0.00**
CEOage	56	49.6	7.11	58	52.8	8.91	0.03**
CEOgen	56	0.00	0.00	58	0.00	0.00	0.00**
BOSS	56	0.44	0.51	58	0.43	0.49	0.87
Multidirectorship	56	1.94	2.96	58	1.44	1.90	0.29
CEO Compensation							
Bonus	13	19.9	21.9	25	12.2	13.9	0.19
Share	13	44.9	11.7	25	92.8	16.3	0.35
Tcomp	13	0.72	0.64	25	0.59	0.45	0.48
Control Variables							
COSTA	56	0.53	0.51	58	0.68	0.46	0.09**
saleba	55	11.8	78.6	57	8.38	20.3	0.29
PPER	50	-38.8	14.1	54	2.42	17.2	0.19
CURRRATIOB	54	1.44	1.03	56	1.39	1.11	0.81
HHI	58	0.28	0.22	56	0.23	0.19	0.17

Source: Author's own calculation

The table above shows the mean and pairwise comparisons between UK cartel firms at home vs. UK cartel firms abroad for various board and CEOs characteristics. The matched pairs of the pairwise comparison varied from 13 to 58 depending on the availability of data.

In one hand, the pairwise differences in board characteristics shows that difference in average board age, gender diversity on the board, the percentage of outside directors' stock ownership, and average board remuneration are not statistically different from zero. On the other hand, the average board size (**Sizeba**) is statistically significantly larger for UK cartel firms at home than for UK cartel firms abroad. In addition, UK cartel firms at home have longer board duration (**Durba**) than the UK cartel firms abroad.

Furthermore, non-executive directors (**NED (%)**) have a significant difference between UK cartel firms at home and UK cartel firms abroad in terms of board characteristics. Hence, this suggests that those UK firms at home have higher percentage of non-executive director than UK firms abroad.

Moreover, board age (**AGEBA**), gender of the board (**GENBA (%)**), outside director ownership (**OUTOWN (%)**) and family-owned and controlled (**FAMCON**) have no significant difference based on p-value of 0.05. These results indicate that these variables do not suggest corresponding impact with one another in terms of cartel formation and discovery.

Additionally, CEO characteristics; CEO tenure (**CEOten**) and CEO age (**CEOage**) demonstrate a significant difference, whilst the mean and standard deviation of 0 for CEO gender (**CEOgen**) indicates that the two groups consider the same distribution or characteristics. Moreover, the CEO compensation package did not identify any statistically significant difference between the UK cartel firms at home and abroad.

The firm ownership (**COSTA**) variable shows a significant difference between UK cartel firms at home and UK cartel firms abroad at a 5% p-value. This result indicates that more UK cartel firms abroad are public firms. For the other control variables, the difference is not significant.

In summary the comparison between UK cartels firms at home and abroad doesn't show a significant difference in between them.

5.4 Correlation Analysis

As a number of explanatory variables are to be used in the regression equation, it becomes important to make sure unique coefficients can be obtained for every independent variable without a relationship (correlation) between them invalidating the results of the regression. *"Multicollinearity exists when there is a strong correlation between two or more predictors in a regression model*" (Field, 2005: 174). The correlation test performance determines if multicollinearity is likely to be a matter of concern and if so, verifies the steps that need to be taken to resolve problems before the regression analysis stage.

Since the data set examined by this study does not conform to parametric assumptions, given that the data is not all normally distributed (although much of the data were approximately normally distributed), it is recommended to use Spearman's Rank-Order Correlation to determine if multicollinearity exists amongst variables. The Spearman's Rank-Order Correlation Coefficient measures the strength of association between two ranked variables.

Table 5.5 below illustrates the results of the Spearman's correlation coefficient matrixes. Only few variables in the matrix exhibit evidence of multicollinearity. The most severe cases of correlation arose between **Total compensation** and **Bonus**, with a correlation of 0.92. Another significant and rather high correlation (80%) is between the CEO dummy variable, **CEOCase** which shows that if the CEO is involved in another cartel, this is highly correlated with the number of cartel cases attached to the CEO's history (**CEONUM)**, with a correlation of 0.84.

Similarly, (**CEONUM**) and (**CEOCase**) are correlated with CEO tenure (**CEOTEN**), poor performance pre-cartel (**PPER**) and **Total compensation**. We believe that these correlations are harmless, especially between the **CEOTEN**, **CEOCase** and **CEOnum**. Anderson, Tatham and Black (1995) and Gujarati (2003) have suggested 0.80 as the threshold at which multicollinearity concern may threaten the regression analysis.

Table 5.5 – Spearman's Rank Order Correlation Matrix

The table presents the pairwise correlations between the variables used in the regression analysis. The sample period is from 1990 to 2008. *CONV* is a dummy variable equal to the prior incidence of cartel formation and discovery. Thus, the value of 0 is assigned for the benchmark comparison with firms without any involvement in cartel activity, referred to here as non-cartel firms. It means that the firm has not formed any cartel, nor had been discovered for any cartel activity, 1 if it was a first-time conviction, 2 if it represented the second conviction, and so on. *Cartel* is a dummy variable which takes the value of 1 if the firm participated and discovered in cartel agreement and 0 otherwise. *Sizeba* is the size of the board pre-cartel formation. *NED%* is the percentage non-executive directors on the board pre-cartel formation. *Ageba* is the age of the board before the cartel formation. *GENBA %* is the average gender ratio of the board pre-cartel formation. *Durba* is the duration of the board pre-cartel formation. *Remun* is the board remuneration pre-cartel formation. *OUTOWN %* is the common stock owned by outside directors on the board pre-cartel formation. *FAMCON* is a dummy variable, which equals 1 if the firm is family owned and controlled; 0 otherwise. *CEOAGE* is computed as the age of the CEO at the starting year of the cartel formation. *CEOTEN* is computed as uninterrupted years on the board of directors up to the year when the cartel started. *CEOGEN* is a dummy variable for both cartel firms and non-cartel firms with value of 1 if CEO was female and 0 if otherwise. *BOSS* is a dummy variable for cartel firms created with a value of 1 if the chair of the board held concentration power of CEO or president and 0 if otherwise. *Multidir* is calculated as the total number of directorship assigned to the CEO on other boards. *Bonus* is calculated as the average three-year CEO bonus. *Share* is calculated as the average three-year CEO shares in the firm. *Tcomp* is calculated as the total average three years CEO compensation in the firm. *HHI* is the Herfindahl-Hirschman Index. *DoJ* is a dummy variable with value of 1 is assigned when the firm is found to have committed a cartel criminal infringement in the jurisdiction. *Saleb* is the average sales pre-cartel formation. *CurrRatioB* is the average of current ratio pre-cartel formation. *PPER* is the average poor financial performance pre-cartel formation. *COSTA* is the firm's ownership status to control for private firms and public firms. *UK* is a dummy variable took value of 1 if the firm based in the UK, 0 otherwise. *JOIN* is the number of member joined the board during that period. *CEONUM is* the total number of cartel cases the CEO is involved in. *CEOCASE* dummy variable shows the total number of cartel cases the CEO was involved in before a-particular cartel case. The variables on board and CEO characteristics were obtained from proxy statements with filing dates three years prior to the cartel agreements started. * indicates statistical significance at the 5%.

Varibles	CONV	Cartel	Sizeba	Durba	Ageba	Genba	NED	Remun	CEOten	CEOage	CEOgen	Multidir
CONV	1.00											
Cartel	**0.90***	1.00										
Sizeba	-0.02	-0.04	1.00									
Durba	-0.11	-0.05	**0.55***	1.00								
Ageba	0.17	0.28*	0.41*	0.34*	1.00							
Genba	0.02	0.09	0.33*	0.13	0.10	1.00						
NED	-0.09	-0.04	0.00	-0.21	0.03	0.12	1.00					
Remun	-0.21	-0.21	0.09	-0.02	-0.12	-0.05	0.13	1.00				
CEOten	-0.45*	-0.38*	0.16	0.35*	-0.16	0.22	0.02	0.21	1.00			
CEOage	**0.57***	**0.61***	0.16	0.06	0.30*	0.02	0.08	0.09	-0.28*	1.00		
CEOgen	-0.23	-0.25*	0.22	0.16	0.24*	0.24*	0.01	0.08	0.01	-0.28*	1.00	
Multidir	0.05	0.01	0.05	0.04	-0.09	-0.17	-0.17	0.12	-0.05	0.01	-0.17	1.00
BOSS	0.15	0.15	-0.08	0.02	-0.08	-0.17	-0.06	-0.24*	-0.41*	0.25*	-0.14	0.01
Bonus	**0.50***	0.45*	-0.32*	-0.23	-0.07	0.02	0.05	-0.07	-0.27*	0.19	-0.23	-0.06
Share	0.40*	0.38*	-0.04	-0.02	-0.12	-0.03	0.10	-0.21	-0.25*	0.32*	-0.16	0.03
Tcomp	**0.58***	**0.56***	-0.32*	-0.18	-0.02	-0.06	-0.02	-0.23*	-0.40*	0.24*	-0.27*	-0.04
Outown	-0.12	-0.06	0.05	0.01	-0.07	0.00	0.14	-0.03	0.16	-0.09	-0.41*	-0.06
FAMCON	0.20	0.10	-0.13	-0.17	-0.07	-0.06	-0.09	-0.04	0.04	0.15	-0.03	-0.02
COSTA	-0.08	-0.17	0.00	-0.05	-0.32*	-0.02	0.21	0.25*	0.28*	-0.04	-0.12	-0.03
PPER	-0.49*	**-0.55***	-0.06	0.12	-0.08	-0.12	-0.17	0.20	0.19	-0.30*	0.22	0.14
Saleb	0.19	0.18	-0.12	-0.07	0.06	0.08	0.37*	0.16	-0.13	0.21	-0.13	0.14
HHI	0.24*	0.20	-0.10	-0.14	-0.28*	-0.17	-0.18	0.07	0.01	0.05	-0.18	0.02
DoJ	0.24*	0.29*	-0.04	-0.01	0.18	0.06	-0.05	-0.09	-0.09	0.16	-0.08	-0.13
UK	0.19	0.15	0.32*	-0.13	0.02	0.02	0.15	0.34*	-0.29*	0.13	0.12	0.13
Join	-0.42*	-0.48*	0.07	-0.05	-0.33*	0.08	0.07	**0.54***	0.49*	-0.35*	-0.06	0.33*
CEOcase	**0.73***	**0.57***	-0.18	-0.22	0.15	-0.18	-0.11	-0.18	**-0.52***	0.32*	-0.15	0.09
CEOnum	**0.88***	**0.83***	-0.18	-0.19	0.20	-0.13	-0.11	-0.25*	**-0.58***	0.49*	-0.22	0.03

Source: Author's own calculation

Table 5.5- (Continued)

Varibles	Boss	Bonus	Shares	Tcomp	Outown	FAMCON	COSTA	PPER	Saleb	HHI	DoJ	UK	Join	CEO case	CEO num
CONV															
CARTEL															
Sizeba															
Durba															
Ageba															
Genba															
NED															
Remun															
CEOten															
CEOage															
CEOgen															
Multidir															
BOSS	1.00														
Bonus	0.14	1.00													
Shares	0.28*	0.25*	1.00												
Tcomp	0.17	**0.92***	0.39*	1.00											
Outown	0.05	-0.08	0.26*	-0.05	1.00										
FAMCON	-0.08	-0.19	-0.09	-0.12	-0.24*	1.00									
COSTA	-0.18	-0.14	0.20	-0.21	0.23	0.05	1.00								
PPER	-0.12	-0.43*	-0.38*	-0.41*	-0.23	0.19	-0.16	1.00							
Saleb	-0.04	0.44*	0.12	0.40*	0.11	-0.16	0.29*	-0.05	1.00						
HHI	0.05	0.18	0.28*	0.19	0.05	0.19	0.18	-0.19	-0.15	1.00					
DoJ	0.06	0.18	0.00	0.23	-0.12	0.33*	-0.23*	-0.10	-0.19	0.08	1.00				
UK	0.08	-0.13	0.12	-0.15	-0.01	0.07	0.15	-0.15	0.04	0.30*	-0.11	1.00			
Join	-0.34*	-0.12	-0.42*	-0.31*	-0.05	-0.02	0.28*	0.20	0.07	-0.04	-0.21	0.08	1.00		
CEOcase	0.14	**0.55***	0.31*	**0.57***	-0.15	0.10	-0.18	-0.44*	0.07	0.20	0.12	0.12	-0.26*	1.00	
CEOnum	0.23	0.49*	0.35*	**0.58***	-0.13	0.16	-0.15	**-0.56***	0.08	0.25*	0.25*	0.17	-0.49*	**0.84***	1.00

Source: Author's own calculation

5.5 Test of Hypotheses (Multivariate Analyses)

The propositions made earlier from a discussion of the literature predicted that prior to the formation of a cartel, various board and CEO characteristics (size, duration, age, gender, and non-executive, outside ownership, family-controlled, remuneration, CEO age, CEO gender, CEO tenure multiple directorships, and concentration power), as well as CEO compensation, may significantly differ between **UK-based cartel firms and non-cartel firms**.

The regression analysis shows the likely incidence of cartel convictions (**CONV**), which in this report refers to *cartel formation and discovery,* as the dependent variable, and CEO and board characteristics serving as predictors. The dependent variable is ordinal in nature with multiple categories between 0 and 22. As noted, logistic regression is an iterative procedure that uses the maximum likelihood methodology to accumulate the likelihood of an event below an ordinal threshold. The first iteration (iteration 0) is the log likelihood of the "*null*" or "*empty*" model, or a model with no predictors. With the next iteration, predictor(s) are included until the log likelihood increases. The goal is to maximise the log likelihood.

This research utilises ten models to test the research propositions. There are several reasons that support the division of the models. **First**, the correlation coefficient associated with the independent variables, which indicates that multicollinearity can be a problem if all variables are included in the same model. This multicollinearity problem is common in this type of research and several studies control it using the means. For instance, the studies that find a high correlation between the corporate governance variables are Ramsay *et al.* (2006), Benkel *et al.* (2006) and Klein (1998). As suggested by Baum (2006), one way to resolve this issue is to omit the collinear variables from the regression. Therefore, several models are formulated to ensure increased accuracy of the results and to avoid any multicollinearity. **Second**, by separating this study into several models, it is possible to investigate the effects of the board characteristics on cartel formation and discovery separately from the effects of ownership structure, CEO characteristics and CEO compensation package. Therefore, the empirical models with the main variables of this study's tests are formed and explained in the next section. **Finally**, some variables such as the CEO gender **(CEOgen)** involved (32 female in 328 Obs). This variable suffers from Sparse-data propensity. This type of data can cause misleading and unreliable inferences about confounding, effect modification, dose response, and induction periods, and may also have an interaction along with some other biases. Therefore, great care must be exercised when adding them to the regression.

5.5.1 Model Descriptions

Models 1–10 set out below are each developed to avoid multicollinearity (avoiding collinear overlaps between variables). They check the comparative influence of the independent variable versus cartel formation and discovery**,** given the control variables used for all the models.

- **Board Characteristics and Ownership structure**

This section provides evidence on whether there is any relationship between board characteristics and cartel formation and discovery.

MODEL 1

Model 1 tests the link between the board characteristics and cartel formation and discovery (**CONV**). The predictor variables are: board size (SIZEBA), board duration (DURBA), board age (AGEBA), gender diversity on the board (GENBA %), non-executive directors (NED %), Remuneration (Remun), and members joined (JOIN) were used as explanatory variables. In addition, firm ownership status (COSTA), poor financial performance pre-cartel sample (PPER), SALE, current ratio (CURRRATIOB), Herfindahl-Hirschman Index (HHI), Department of Justice (DoJ), country dummy (UK), and fixed effects (year and industry dummy) were used as control variables. Hence:

$$\begin{aligned}\mathrm{CONV}_i &= \alpha + \beta_1 SIZEBA_i + \beta_2 DURBA_i + \beta_3 AGEBA_i + \beta_4 GENBA_i + \beta_5 \%NED_i \\ &+ \beta_6 REMUN_i + \beta_7 JOIN_i + \beta_8 COSTA_i + \beta_9 PPER_i + \beta_{10} SALE_i \\ &+ \beta_{11} CURRATTIO_i + \beta_{12} HHI + \beta_{13} DoJ_i + \beta_{14} UK_i + Fixedeffec\ ts + \varepsilon_i\end{aligned}$$

- **Ownership Structure**

Model 2 tests the link between ownership structure and cartel formation (**CONV**). The predictor variables are: Average board size (SIZEBA), outside ownership (OUTOWN %), family-owned and controlled (FAMCON), non-executive directors (NED %) and CEO concentration power (BOSS). In addition, firm ownership status (COSTA), poor financial performance pre-cartel formation sample (PPER), SALE, Herfindahl-Hirschman Index (HHI), country dummy (UK), and fixed effects (year and industry dummy) were used as control variables. Hence:

$$\begin{aligned}\mathrm{CONV}_i &= \alpha + \beta_1 \mathrm{FAMCON}_i + \beta_2 \%OUTOWN_i + \beta_3 \%NED_i + \beta_4 SIZEBA_i + \beta_5 BOSS_i + \beta_6 COSTA_i + \beta_7 PPER_i \\ &+ \beta_8 SALE_i + \beta_9 HHI + \beta_{10} UK_i + Fixedeffec\ ts + \varepsilon_i\end{aligned}$$

- **CEO Characteristics**

This partition presents evidence on whether or not there is any relation between CEO attributes and cartel formation and discovery (**CONV**).

MODEL 3

CEO tenure (CEOTEN), CEO age (CEOAGE), multiple directorship (MULTIDIR) and concentration power BOSS were used as explanatory variables. Also firm ownership (COSTA), poor financial performance (PPER), sale, current ratio (CURRRATIOB), Herfindahl-Hirschman Index (HHI), Department of Justice (DoJ), and fixed effects (year and industry dummy) were used as control variables. Hence:

$$\text{CONV}_i = \alpha + \beta_1 CEOTEN_i + \beta_2 CEOAGE_i + \beta_3 MULTIDIR_i + \beta_4 BOSS_i + \beta_5 COSTA_i + \beta_6 PPER_i + \beta_7 SALE_i + \beta_8 CURRATTIO_i + \beta_9 HHI_i + \beta_{10} DoJ_i + Fixedeffec\,ts + \varepsilon_i$$

MODEL 4

All variables included in the second model are retained, except PPER (poor financial performance). A new variable CEOGEN (CEO gender) is also included. Hence:

$$\text{CONV}_i = \alpha + \beta_1 CEOTEN_i + \beta_2 CEOAGE_i + \beta_3 CEOGEN_i + \beta_4 MULTIDIR_i + \beta_5 BOSS_i + \beta_6 COSTA_i + \beta_7 SALE_i + \beta_8 CURRATTIO_i + \beta_9 HHI_i + \beta_{10} DoJ_i + Fixedeffec\,ts + \varepsilon_i$$

MODEL 5

As the data has revealed that some of the CEOs were convicted more than once, it is relevant to control for the number of cartel cases the CEO was involved in before-the cartel sample. Model 5, all variables included in the third model are retained and a new variable CEOCASE (Dummy variable shows the total number of cartel cases the CEO was involved in before a-particular cartel case) is included. Hence:

$$\text{CONV}_i = \alpha + \beta_1 CEOTEN_i + \beta_2 CEOAGE_i + \beta_3 CEOGEN_i + \beta_4 MULTIDIR_i + \beta_5 BOSS_i + \beta_6 CEOCASE + \beta_7 COSTA_i + \beta_8 SALE_i + \beta_9 CURRATTIO_i + \beta_{10} HHI_i + \beta_{11} DoJ_i + Fixedeffec\,ts + \varepsilon_i$$

MODEL 6

In this model, we control for the total number of cartel cases the CEO was involved in. Model 6, all variables included in the previous model were retained, except CEOCASE (The number of

cartel cases the CEO was involved in before-a particular cartel case), which was replaced by a new variable CEONUM (total number of cases the CEO was involved in).

$$CONV_i = \alpha + \beta_1 CEOTEN_i + \beta_2 CEOAGE_i + \beta_3 CEOGEN_i + \beta_4 MULTIDIR_i + \beta_5 BOSS_i + \beta_6 CEONUM + \beta_7 COSTA_i + \beta_8 SALE_i + \beta_9 CURRATTIO_i + \beta_{10} HHI_i + \beta_{11} DoJ_i + Fixedeffec\ ts + \varepsilon_i$$

- **Board and CEO Characteristics**

MODEL 7

In Model 7**,** the CEO and board characteristics are the following (which are also used as explanatory variables): CEO tenure (CEOTEN), CEO age (CEOAGE), multiple directorship (MULTIDIR), concentration power (BOSS), board size (SIZEBA), board duration (DURBA), average age of the board (AGEBA), % gender on the board (GENBA %), outside ownership (OUTOWN %), (FAMCON) family-owned and controlled, non-executive directors (NED%), members joined (JOIN). The control variables are Firm ownership (COSTA), Poor financial performance (PPER), sale, current ratio (CURRRATIOB), Herfindahl-Hirschman Index (HHI), Department of Justice and fixed effects (year and industry dummy) were used as control variables. Hence:

$$CONV_i = \alpha + \beta_1 CEOTEN_i + \beta_2 CEOAGE_i + \beta_3 CEOGEN_i + \beta_4 MULTIDIR_i + \beta_5 BOSS_i + \beta_6 SIZEBA_i + \beta_7 DURBA_i + \beta_8 AGEBA_i + \beta_9 GENBA_i + \beta_{10} \%OUTOWN_i + \beta_{11} \mathrm{FAMCON}_i + \beta_{12} \%NED_i + \beta_{13} REMUN_i + \beta_{14} JOIN_i + \beta_{15} COSTA_i + \beta_{16} SALE_i + \beta_{17} CURRATTIO_i + \beta_{18} HHI + \beta_{19} DoJ_i + Fixedeffec\ ts + \varepsilon_i$$

- **CEO Compensation Package**

As results from previous models demonstrate a very significant link between CEO characteristics and cartel formation, we conduct a second test to provide more evidence for the validity of our interpretation on the observed relation between the CEO characteristics and the cartel formation and discovery. Specially, a regression between cartel formation (the dependent variable) and predicted CEO compensation and other control variables is estimated.

Model 8

CEO tenure (CEOTEN), CEO age (CEOAGE), multiple-directorship (MULTIDIR), concentration power (BOSS), and BONUS are used as explanatory variables. Also firm ownership (COSTA), poor financial performance (PPER), sale, current ratio (CURRRATIOB), Herfindahl-Hirschman Index (HHI), and Department of Justice (DoJ) are used as control variables.

$$Cartel = \alpha + \beta_1 CEOTEN_i + \beta_2 CEOAGE_i + \beta_3 MULTIDIR_i + \beta_4 BOSS_i + \beta_5 Bonus_i + \beta_6 COSTA_i + \beta_7 PPER_i + \beta_8 SALE_i + \beta_9 CURRATTIO_i + \beta_{10} HHI + \beta_{11} DoJ_{ii} + \varepsilon_i$$

Model 9

All variables in Model 8 are retained except the variable SHARE, which is replaced by the variable BONUS.

$$Cartel_i = \alpha + \beta_1 CEOTEN_i + \beta_2 CEOAGE_i + \beta_3 MULTIDIR_i + \beta_4 BOSS_i + \beta_5 Share_i + \beta_6 COSTA_i + \beta_7 PPER_i + \beta_8 SALE_i + \beta_9 CURRATTIO_i + \beta_{10} HHI + \beta_{11} DoJ_i + \varepsilon_i$$

Model 10

In model 10, all variables are retained except for the variable SHARE, which is replaced by the Total compensation variable.

$$Cartel_i = \alpha + \beta_1 CEOTEN_i + \beta_2 CEOAGE_i + \beta_3 MULTIDIR_i + \beta_4 BOSS_i + \beta_5 TotalIncentive_i + \beta_6 COSTA_i + \beta_7 PPER_i + \beta_8 SALE_i + \beta_9 CURRATTIO_i + \beta_{10} HHI + \beta_{11} DoJ_i + \varepsilon_i$$

5.6 Empirical results

The results are obtained by estimating the relationship between the number of cartel formation and discovery and corporate governance characteristics once a cartel crime has been committed. The pairwise comparisons in Table 5.2 have already shown systematic and statistically significant differences between UK-based cartel firms and non-cartel firms (CEO age, CEO gender, multiple directorships, and the concentration power of the CEO). The ordered logit models also found strong associations between cartel formation and discovery (**CONV)** and board characteristics, as well as CEO characteristics, with the likelihood of cartel formation raised or decreased by certain predictors.

5.6.1 Board Characteristics Estimation Results

The main objective of this model is to determine whether or not board characteristics affect cartel formation. Table 5.6 below shows the results for model 1:

Table 5.6- Board Characteristics- Ordered Logit Estimation Results

The table reports the results of ordered logit regressions of a dummy variable equal to the prior incidence of cartel formation and discovery (*CONV*). Thus, the value of 0 is assigned for the benchmark comparison with firms without any involvement in cartel activity, referred to here as non-cartel firms. It means that the firm has not formed any cartel, nor had been discovered for any cartel activity, 1 if it was a first-time conviction, 2 if it represented the second conviction, and so on, in this cartel formation and discovery as dependent variable on a number of financial and corporate governance variables for the sample of mainly UK-based cartel firms and matched non-cartel firms. For every cartel firm, a control group of non-cartel firms was created, which share the first three digits of the SIC code and similar firm size based on net sale within ±25% of the cartel firm's sales at the end of the year before the collusive agreement started. Firm-years, in which cartel firms, i.e., firms that at one point in time during our sample period are part of a cartel agreement, are not participating in a cartel, are excluded from this analysis. *Sizeba* is the size of the board pre-cartel formation. *NED%* is the percentage non-executive directors on the board pre-cartel formation. *Ageba* is the age of the board before the cartel formation. *GENBA %* is the average gender ratio of the board pre-cartel formation. *Durba* is the duration of the board pre-cartel formation. *Remun* is the board remuneration pre- cartel formation. *Saleb* is the average sales pre-cartel formation. *CurrRatioB* is the average of current ratio pre-cartel formation. *PPER* is the average poor financial performance pre-cartel formation. *COSTA* is the firm's ownership status to control for private firms and public firms. *UK* is a dummy variable took value of 1 if the firm based in the UK, 0 otherwise. *JOIN* is the number of member joined the board during that period. The variables on board characteristics were obtained from proxy statements with filing dates three years prior to the cartel agreements started. The equality of means is tested using a standard *t*-test and the equality of medians using a Wilcoxon signed rank test. ***, **, * indicates statistical significance at the 1%, 5%, 10% level.

Dependent variable: Conviction (Formation and discovery)		**Model 1**	
Independent Variables	**Expected Sign**	**Coeff.**	**Z**
Sizeba	(+)	0.12	2.45**
AGEBA	(-)	-0.01	-0.34
GENBA (%)	(-)	-0.93	-0.71
DURBA	(-)	-0.20	-1.17
NED (%)	(-)	-3.44	-3.40**
REMUNR	(+)	0.03	3.55**
JOIN		-0.1	-2.03**
Control Variables			
COSTA		1.08	3.44**
PPER		-0.30	-2.50**
Saleb		0.04	3.05**
CurrRatioB		-0.14	-1.09
HHI		1.57	2.02**
DoJ		1.77	3.08**
UK		-0.17	-0.53
Industry effect		Yes	
Year effect		Yes	
Number of Obs		**215**	
Pseudo R2		**0.18**	

Source: Author's own calculation

- **Dependent Variables**

Board Size

The size of the board has been shown to have an impact on the quality of corporate governance. The concept that large boards can be dysfunctional is confirmed in two broad statistical studies (e.g., Yermack 1996; Eisenberg 1998).

Assessing cartel formation as evidence of a 'dysfunctional' board, the results are consistent with Yermack (1996) and Eisenberg (1998). The result shows that the propensity to get in cartel agreement is positively related to the size of the board, and this effect is examined by measuring board size as the total number of the firm's directors (e.g., Beasley, 1996; Yermach, 1996; Abbot *et al.*, 2004; Vafeas, 2000; and Coles *et al.*, 2008).

It is also costly to manage a large board of directors in an organisation (Lipton and Lorsch, 1992; Jensen, 1993). Large boards also tend to have disagreements and difficulty in performing efficient roles. Gonzales and Schmid (2012) have documented that mature and large low-growth firms tend to participate in cartel. The coefficient for **SizeBA** was been found to be positive and statistically significant ($\beta=0.12$, $z=2.45$, $p<0.05$), with differences in the average size of the board **(SizeBA)** between UK –based cartel firms and non-cartel firms. Therefore, **P1** is accepted, *that the average size of boards is larger for cartel firms than amongst a matched sample of non-cartel firms.*

Board Independency (Non-executive directors)

Board independence is regarded as a very important element in an organisation due to the fact that outside directors are considered the control and monitor mechanism in the firm, who can also enhance firm performance (Duchin, *et al.*, 2010; Fama and Jensen, 1983; Weishbach, 1988). Being financially independent from the management, and from possibly conflicting situations, outside directors have the ability to minimise agency problems and control managerial self-interests (Rhodes, *et al.*, 2000). They are able to protect the shareholder interest, as well as supervise and manage performance in a much better way to align firm strategies for greater performance. A large board is likely to be made up of executive directors who are not independent **(NED %)**. These directors are more concerned with maximising their personal wealth rather than working for the best interest of the firm. Consequently, they become more inclined to engaging in cartel activity that would facilitate growth in earnings and thus maximise their personal wealth.

In addition, engaging in cartel activity can enable these **NED**s to conceal some information from shareholders, thereby increasing the probability of increasing their personal gains. For example, cartel activity can enable directors to hide some related party transactions which may not be at arm's length. Consistent with the proposition that *the percentage of outside (non-executive) members on the board of directors is lower for cartel firms than for non-cartel firms* **P2**, the

table shows that the coefficient for **NED%** is negative and statistically significant (β=-3.44, z=-3.40, p<0.05). These results indicate that the boards of non-cartel firms have higher percentage of non-executive directors than do the boards of UK-based cartel firms. This finding is consistent with Fama (1980) and with Fama and Jensen (1983), who argued that higher percentage of outsider increases the effectiveness of board oversight and monitor.

Age of the Board

Several views have been stated by researchers regarding the age of the board of directors. On one hand, some of them state that as the board members grow older, their productivity levels decline. On the other hand, the older board members are found to have much more experience and a well-integrated social network to enhance the performance of the organisation.

Corporate risk-taking is influenced by board age, in which a link is indicated between older boards and less firm risk-taking (Elsaid (2012)). The result shows that the average age of the director on the board (**AGEBA**) in relation to cartel formation and discovery is negative, but statistically not significant. Therefore, we cannot proposition **P3** *that the average age of board directors for cartel firms is lower than non-cartel firms.*

However, this result consistent with Wiersema and Bantel (1992), who argued that when firms bring about various changes in their corporate strategy, it is usually seen that the top management of the firm has a lower average age, which could mean that as age increases risk aversion increases. Also Campbell (2001) reports a negative age impact on engaging in equity investments. Analyzing risk perceptions of households, Bucciol and Miniaci (forthcoming) found that risk tolerance is reduced in age and a review study by Sahm (2007) and Grable, McGill, and Britt (2009) suggests that older individuals are less risk tolerant.

Gender Diversity of the Board

The percentage of gender diversity of the board **(GENBA %)** variable is negative but statistically not significant. Therefore, we cannot accept proposition **P4:** *That there are less female directors on the board of cartel firms than the non-cartel firms.* Yet, this result may not be surprising, that statistical significance was lacking, given the sparse distribution of females on cartel and non-cartel firms (5.5% on cartel boards, and 11.1% amongst non-cartel firms).

The result consistent with many studies conducted using different factors like experience, attitude etc. which prove that women are less corrupt than men (e.g. Cheung and Hernandez-Julian, 2006; Swamy, Azfar, Knack *et al.*, 1999).

Barsky and colleagues (1997 cited in Berger *et al.,* 2012) and Jianakoplos and Bernasek (1998 cited in Berger *et al.,* 2012), documented that female executives tend to be more risk averse in decision making relating to financial concerns, which support this study findings.

Board Duration

The duration of the board (**DURBA**) is statistically negative but insignificant. However, the results suggest that the longer the duration of the board, the lower is the number of cartel formation in UK-based firms, and thus the lower are the incentives to engage in cartel formation. Therefore, we cannot accept proposition **P5,** *that the average duration of the cartel board is less than the non-cartel firms.*

The number of board members appointed during the CEO's regime preceding the cartel formation, **JOIN**, is negative and statistically significant (β=-0.20, z=-1.17, p<0.10). The more directors who join a board, the less likelihood that cartel formation will arise. This is consistent with the finding that board duration, **DURBA**, is also negatively linked to cartel formation. This is consistent with Vance's (1983) claim that boards of long duration are generally interested in achieving the goals of the organisation.

Board Remuneration

Moreover, the proposition that *the board remuneration for cartel firms is higher than in non-cartel firms* - addressed in proposition **P6** is confirmed in the results. The coefficient for variable remuneration (**Remun)** is positive and statistically significant (β=0.03, z=3.55, p<0.05). These results indicate that the board of UK-based firms who are convicted in cartel formation have higher board compensation levels than non-cartel firms. This finding is consistent with research developing different theoretical models all linking incentives and fraud, which find positive relations between board compensation and fraud (Bar-Gill and Bebchuk, 2003a and 2003b; Goldman and Slezak, 2003; Chesney and Gibson-Asner, 2004; Robison and Santore, 2011).

- **Control Variables**

Firm Ownership Status

The current status of the firm (**COSTA**) has a positive impact on the number of incidences of cartel formation and discovery (β=1.08, z=3.44, p<0.05). Recall that this variable takes on the value of 1 if the firm is publicly-traded and the value of 0 if it is privately-owned and controlled. The positive coefficient suggests that UK-based public firms are more likely to form cartel than UK-based private firms. The results also show that the impact of the firm ownership (**COSTA)** is quite definite as one can fully reject the null hypothesis that the coefficient is not significantly different from zero.

Firm Sale

The average sale for the 3-year period pre-cartel formation (**SALEBA**) has a positive and significant coefficient (β=0.04, z=3.05, p<0.05). This suggests that UK-based firms with higher average sale are more likely to engage in cartel formation. This result is support the earlier finding that UK-based public firms are more likely to form cartel (**COSTA**), since public firms are larger thus their sales is expected to be higher. This result indicates that the higher the previous three years average sale, the more likely that the firm will involve in cartel formation.

Poor Financial Performance

The poor performance of a firm (**PPER**) has also a negative and significant coefficient (β=-0.30, z=-2.50, p<0.05). This result is in contrast with that of DeAngelo and DeAngelo (1990) DeAngelo *et al.* (1994), and Beasley and Hermanson *et al.* (2006). Their results suggest a positive and significant relationship between poor performance and firm fraud, but since firms collude together not only to maximise profits but also to maintain their price, this result suggests that the UK-based cartel firms are more likely to have a good financial performance, which also supports our previous results that more UK-based public firms are likely to collude than private firms.

Herfindahl-Hirschman Index

The Herfindahl-Hirschman Index (**HHI**) has a significant and positive coefficient (β=1.77, z= 2.02, p<0.05). This result indicates that the null hypothesis that the coefficient is not significantly different from 0 can be rejected. This finding is unsurprising since high market concentrations, measured by the Herfindahl-Hirschman Index, indicate an industry that is

dominated by few, oligopolistic firms. Such firms can more easily engage in cartel activity such as price fixing, and create artificial supply shortages, since problems of cartel co-ordination are much reduced.

Current Ratio

The average current ratio (**CURRRATIOB)** has a negative coefficient but statistically not significant. This finding shows that as the current ratio increases, the incentive to form a cartel reduces, and vice versa. The results are consistent with how financially constrained or distressed firms (with higher debt ratios) are more likely to engage in cartel activity so as to stabilise or even improve their performance.

Legal Environment

Chapter two discussed previously that the U.S Department of Justice (**DoJ**) is the first to impose fines and prison sentences on individuals involved in cartel agreements. Therefore, in order to control for the legal environment, we added the variable (**DoJ**). This variable describes the jurisdictional zone where the conviction case was set (cartel formation and discovery). The variable took a value of 1 when the firm is found to have committed a cartel criminal infringement by the **DoJ**, and 0 if otherwise. The commission of a cartel criminal infringement is essentially cartel formation and discovery, which is the dependent variable. As can be observed there is a strong positive relationship between the number of incidences of cartel formation and discovery (**CONV**) and the number of UK-based firms convicted by the DoJ. This implies that the higher the number of UK-based cartel firms, the higher the number of cartel convictions by the DoJ, and vice versa.

5.6.2 Ownership Structure Estimation Results

The main objective of this model is to determine whether or not ownership structure of the firms influences cartel formation. The identity of the large shareholders (family firms in this section) determines the kind of ownership concentration within a firm. The large shareholders also establish the relationship between the performance of the firm and the type of ownership. The concentration of ownership in this thesis is divided into two owner groups to allow for its evaluation: the stock owns by outside directors and family-owned and controlled firms. Table 5.7 below shows the results for model 2:

Table 5.7- Ownership Structure- Ordered Logistic Estimation Results

The table reports the results of ordered logit regressions of a dummy variable equal to the prior incidence of cartel formation and discovery (*CONV*). Thus, the value of 0 is assigned for the benchmark comparison with firms without any involvement in cartel activity, referred to here as non-cartel firms. It means that the firm has not formed any cartel, nor had been discovered for any cartel activity, 1 if it was a first-time conviction, 2 if it represented the second conviction, and so on, in this cartel formation and discovery as dependent variable on a number of financial and corporate governance variables for the sample of mainly UK-based cartel firms and matched non-cartel firms. For every cartel firm, a control group of non-cartel firms was created, which share the first three digits of the SIC code and similar firm size based on net sale within ±25% of the cartel firm's sales at the end of the year before the collusive agreement started. Firm-years, in which cartel firms, i.e., firms that at one point in time during our sample period are part of a cartel agreement, are not participating in a cartel, are excluded from this analysis. *OUTOWN %* is the common stock owned by outside directors on the board pre-cartel formation. *FAMCON is* a dummy variable, which equals 1 if the firm is family owned and controlled; 0 otherwise. .*Sizeba* is the size of the board pre-cartel formation. *NED%* is the percentage non-executive directors on the board pre-cartel formation. *Ageba* is the age of the board before the cartel formation. *BOSS* is a dummy variable for cartel firms created with a value of 1 if the chair of the board held concentration power of CEO or president and 0 if otherwise. *HHI* is the Herfindahl-Hirschman Index. *PPER* is the average poor financial performance pre-cartel formation. *UK* is a dummy variable took value of 1 if the firm based in the UK, 0 otherwise. The variables on ownership structure were obtained from proxy statements with filing dates three years prior to the cartel agreements started. The equality of means is tested using a standard *t*-test and the equality of medians using a Wilcoxon signed rank test. ***, **, * indicates statistical significance at the 1%, 5%, 10% level.

Dependent Variable: *Cartel formation and Discovery* (Conv)	**Model 2**		
Independent Variables	Expected Sign	Coeff.	z
OUTOWN (%)	(-)	0.06	0.17
FAMCON	(+)	-2.65	-2.34**
SIZEBA	(+)	0.04	0.82
NED (%)	(-)	-1.97	-1.76
BOSS	(+)	1.20	4.76**
Control Variables			
COSTA		1.34	5.48**
PPER		0.00	-2.60**
SALEB		0.00	1.18
HHI		1.72	2.86**
UK		-0.34	-0.97
Industry dummy		Yes	
Year dummy		Yes	
Pseudo R2		0.17	
Obs		285	

Source: Author's own calculation

Outside Directors' Stock Ownership

The coefficient for the variable outside ownership (**OUTOWN %)** is positive but statistically not significant. However, this result suggests that the percentage of outside directors' stock ownership is relatively higher for UK-based cartel firms than for a matched sample of non-cartel firms. This result is contradictory to our expectation, therefore we cannot accept proposition **P7**: *that the percentage of outside directors' stock ownership is lower for cartel firms than for a matched sample of non-cartel firms.*

Family-Owned and Controlled Firms

The formation of a cartel is significantly and negatively influenced by the family as the results given in Table 5.7 signify. The claim that family owners create enhanced governance and supervisory systems has been affirmed through this result. The agency problem between managers and owners can be lessened through family control which is why significant and negative effects of family shareholdings are obtained (Fama and Jensen, 1983). The large shareholders are better able to monitor the management compared to small shareholders. This is because large shareholders internalise larger aspects of the monitoring costs and possess sufficient voting power in corporate decisions. Small shareholders, on the other hand, are only able to influence corporate decision making at a minimum basis. Because small shareholders have little influence on decision making, the managers then hold the control of the firm, who possess both the opportunities and incentive of misusing their position. It is therefore concluded that corporate performance would be adversely affected by the ownership-control separation (Laiho, 2011; Hamdani and Yafeh, 2010; Leech, 2001).

In addition Laiho (2011) states that a more effective monitoring takes place through a more concentrated ownership in the form of large shareholders. Effective monitoring has two significant obstacles that may be solved by large shareholders: staying informed to enable reaping sufficient benefits towards exceeding the costs of obtaining the needed information; and possessing an adequately large share of the votes in order to influence corporate outcomes (even in circumstances of minority holding). Small shareholders, on the other hand, have difficulty carrying this out collectively as they are only able to internalise a small aspect of the potential gains and endure free-rider problems. An agency problem identified here is therefore the incentive of large shareholders to gain private benefits at the detriment of the small shareholders (Laiho, 2011; Kaisanlahti, 2002; Bebchuck, 1999).

Therefore, we cannot accept the proposition **P8**: *that cartel likely to be formed by family-owned and controlled firms (large shareholders).*

CEO Concentration Power

The coefficient for the concentration power variable (**BOSS**) was found to be positive and statistically different from zero in estimating its influence on cartel formation (**CONV).**This positive figure shows that concentration power increases incentives to form cartel. Therefore, we reject the null hypothesis that the coefficient is not significantly different from zero at the 5% level of significance. This is consistent with prior studies, which discuss the case of fraud in general (Loebbecke *et al.*, 1989; Jensen, 1993). Hence **P13:** *is accepted, that firms committing cartel are more likely to have CEOs who also have a dual role serving as board chairs.*

5.6.3 CEO Characteristics Estimation Results

The main objective of this model is to determine whether or not CEO characteristics affect cartel formation. Table 5.8 below shows the results for model 3, 4, 5 and 6:

Table 5.8- CEO Characteristics- Ordered Logistic Estimation Results

The table reports the results of ordered logit regressions of a dummy variable equal to the prior incidence of cartel formation and discovery (*CONV*). Thus, the value of 0 is assigned for the benchmark comparison with firms without any involvement in cartel activity, referred to here as non-cartel firms. It means that the firm has not formed any cartel, nor had been discovered for any cartel activity, 1 if it was a first-time conviction, 2 if it represented the second conviction, and so on, in this cartel formation and discovery (*CONV*) as dependent variable on a number of financial and corporate governance variables for the sample of cartel firms and matched non-cartel firms. For every cartel firm, a control group of non-cartel firms was created, which share the first three digits of the SIC code and similar firm size based on net sale within ±25% of the cartel firm's sales at the end of the year before the collusive agreement started. Firm-years, in which cartel firms, i.e., firms that at one point in time during our sample period are part of a cartel agreement, are not participating in a cartel, are excluded from this analysis. *CEOAGE* is computed as the age of the CEO at the starting year of the cartel formation. *CEOTEN* is computed as uninterrupted years on the board of directors up to the year when the cartel started. *CEOGEN* is a dummy variable for both cartel firms and non-cartel firms with value of 1 if CEO was female and 0 if otherwise. *BOSS* is a dummy variable for cartel firms created with a value of 1 if the chair of the board held concentration power of CEO or president and 0 if otherwise. *Multidir* is calculated as the total number of directorship assigned to the CEO on other boards. *CEONUM is* the total number of cartel cases the CEO is involved in. *CEOCASE* dummy variable shows the total number of cartel cases the CEO was involved in before a-particular cartel case. *HHI* is the Herfindahl-Hirschman Index. *DoJ* is a dummy variable with value of 1 is assigned when the firm is found to have committed a cartel criminal infringement in the jurisdiction. *Saleb* is the average sales pre-cartel formation. *CurrRatioB* is the average of current ratio pre-cartel formation. *PPER* is the average poor financial performance pre-cartel formation. *COSTA* is the firm's ownership status to control for private firms and public firms. *UK* is a dummy variable took value of 1 if the firm based in the UK, 0 otherwise. The variables on CEO characteristics were obtained from proxy statements with filing dates three years prior to the cartel agreements started. The equality of means is tested using a standard *t*-test and the equality of medians using a Wilcoxon signed rank test. ***, **, * indicates statistical significance at the 1%, 5%, 10% level.

Dependent variable: *Cartel formation and discovery(CONV)*		**Model 3**		**Model 4**		**Model 5**		**Model 6**	
Independent Variable	**Expected Sign**	**Coeff.**	**Z**	**Coeff.**	**Z**	**Coeff.**	**Z**	**Coeff.**	**Z**
CEOTen	(-)	-0.10	-2.95**	-0.07	-2.43**	-0.02	-0.59	-0.01	-0.44
CEOage	(+)	0.05	3.59**	0.06	4.37**	0.06	4.26**	0.04	3.77**
CEOgen	(-)			-3.31	-2.99**	-3.13	-2.83**	-2.46	-2.76**
Multidir	(-)	-0.14	-1.53	-0.11	-1.52	-0.10	-1.48	-0.05	-0.58
BOSS	(+)	0.79	2.59**	0.94	3.42**	1.10	3.83**	0.76	2.50**
CEONUM	(+)							2.27	4.22**
CEOCASE	(+)					1.8	5.53**		
Control Variables									
PPER		-0.00	-3.00**						
Costa		1.25	4.46**	1.36	5.06**	1.30	4.77**	1.19	4.03**
Saleb		-0.00	-0.67	-0.00	-0.87	-0.05	-0.16	0.01	1.89
CurrRatioB		-0.11	-1.11	-0.01	-0.16	-0.04	-0.35	-0.04	-0.39
HHI		1.33	2.71**	1.79	2.58**	1.43	2.21**	1.42	1.91
DoJ		1.94	4.36**	1.67	4.18**	1.56	3.02**	0.99	1.46
UK		-0.26	-0.79	-0.41	-1.24	-0.31	-0.09	0.01	0.02
Industry effect			Yes		Yes		Yes		Yes
Year effect			Yes		Yes		Yes		Yes
Number of Obs			**279**		**308**		**308**		**308**
Pseudo R2			**0.233**		**0.230**		**0.395**		**0.525**

Source: Author's own calculation

CEO Tenure

The multivariate test results emphasize the univariate comparisons that were presented in Table 5.2. The ordered logit model shows that the CEO tenure coefficient, **CEOTEN** used in models 3 and 4 is negative and significantly different from zero in estimating cartel formation and discovery (**CONV)**, given other predictor variables in all models (β=-0.10, z=-2.95, -2.43, $p<0.05$). The results confirm the earlier pairwise univariate comparison between UK-based cartel firms and non-cartel firms. This finding is in consistent with **P10**; *the results indicate that the number of years the CEO has served as director for cartel firms is actually less than for non-cartel firms*. It gives light to the assumption about whether CEO tenure, along with overlap of CEO and board chair roles (**BOSS**), help carry out the monitoring process of corruption activities for cartel firms (Mace 1986; Patton and Baker 1987; Vancil 1987).

Hence, the result is in contrast with some studies investigating CEO tenure and firm fraud. Loebbecke *et al.*'s (1989) study found a positive relationship between the two variables, but the fraud was often very specifically in connection with 'income smoothing' behaviour after a pronounced growth period which is then followed by much poorer financial performance in a subsequent downturn. Longer serving CEOs wished to smooth income, and likely had the depth of knowledge and intra-firm connections to make this form of fraud more plausible and likely. The controls used in this study in fact minimise the role of poor financial performance as a predictor for cartel activity. Even if many aspects are similar, a direct comparison between the studies is not altogether appropriate for every variable.

The finding is however in line with researchers who conducted another logit analysis between fraud and non-fraud firms, using CEO tenure as an independent variable (Beasley, 1996). The basis of Beasley's study is much closer to the study conducted here, and in fact Beasley's study used similar variables CEO tenure (**CEOTen)** and overlap of the CEO and board chair roles **(BOSS)** in the logit analysis. The variable **BOSS** was also found to be positively correlated with the likelihood of financial fraud misstatements. The finding also agrees with how long-tenured CEOs are less likely to have appropriate strategies (Wiersema and Bantel, 1992). This is of interest if cartel activity is accepted as a measure of a lack of strategic change ability, i.e. opting for the status quo amongst cartel firms. The results are also consistent with evidence suggesting that firms are more likely to be involved in cartel crime when CEO tenure is low, or equivalently, when CEO turnover is high (Han, 2010). Hence, it is possible to say that this

research extends previous research on fraudulent financial misstatements and board composition, and finds comparable results for how board composition and CEO tenure are likely to affect the probability of cartel formation and discovery.

Therefore, **P10** is accepted: *the number of years a CEO had served as a director for a cartel firm is less than that for non-cartel firms*. If CEO entrenchment has in fact been found to have various negative consequences, especially in terms of excess remuneration and the stacking of outside directorships (Vafeas 2003), one benefit is to make cartel formation relatively less likely. The effect is not, however, large. Based on the figures above, the null hypothesis that the coefficient is not significantly different from zero can be rejected at 5% level of significance. The effect is not large in quantity but still has a strong signature in the data.

CEO Age

Consistent with expectations, the results of all the models show a positive and significant relationship between CEO age (**CEOAGE)** and the likelihood of cartel formation in UK-based firms ($\beta=0.05$, $z=3.62$, $p<0.05$). The parameter is significant at 5% level of significance, suggesting that the null hypothesis that the factor loading on CEO age is not significantly different from zero can be rejected. The evidence suggests that the older the CEO, the higher is the incentive to engage in cartel formation. Firms engaging in strategic change often have top management teams (defined to include the CEO as well as second executive levels) characterised by a lower average age (Han, 2010). Older executive teams (on average in the first and sector tier management hierarchy), are in their study more conservative in terms of strategy development.

Older CEOs are likely to be more conservative and this has a positive impact on firm performance, but also less likelihood of fraud (and increased CEO tenure means less fraud) (Stevens *et al.*, 1978). However, fraud happens amongst single firms – it is a singular activity by one firm. Cartel formation on the other hand has different and more social dynamics. Older CEOs may have strong established social networks that enable the communication necessary to cartel formation. Older CEOs may have worked for many organisations and established a number of strong networks. As a result, engaging in collusion with other firms will be less difficult (Beasley, 1996). Older CEOs established in certain industries can also understand how those market structures perhaps make the formation of a cartel agreement a ‘rational decision’.

On average, the probability that a CEO will leave the firm falls up to the age of 52 but begins to rise beyond that. CEO turnover therefore does increase with age. However, those CEOs that approach retirement age but whose firm has a superior corporate performance are less likely to leave the firm, than those that have nearly reached retirement age and whose firms are performing poorly. The latter are more likely to retire early, and thus increase CEO turnover and lower CEO tenure. Older CEOs may use the shorter career time remaining to at least ensure maintaining their personal benefits. Engaging in cartel activity could be seen as a means of retaining and insuring continued levels of expected remuneration (and status) before eventually retiring and leaving the firm (Bebchuck and Grinstein, 2005).

On the contrary, younger CEOs should expect in comparison to have a longer tenure with the firm. Younger CEOs in the early stages of corporate careers are yet to establish strong networks, and may not wish to suffer the reputational consequences of discovered cartel activity so early in their careers. Consequently engaging in cartel activity may be more difficult and higher risk for younger CEOs, and so less expected of younger CEOs in the organisational culture. Younger CEOs may therefore be more interested in maintaining a good reputation by maximising shareholder wealth through competitive means and building competitive advantage. In addition then, younger CEOs have a longer time in their career path and thus would be more interested in protecting their long-term careers from reputational damage.

Therefore **P9** as well as **P10** are accepted: *the age of the CEO for cartel firms is higher than for non-cartel firms,* but that CEO tenure has a reverse effect. One possible implication would be to combine the two propositions, that an older CEO with a shorter expected tenure may well use wide corporate social network connections, perhaps pressured by poorer corporate performance and the avoidance of forced early retirement, to resort to cartel formation as a pseudo-strategic response to market conditions. However, the relationship between CEO tenure and CEO age is difficult to model but generally, the risk of termination does increase for thirteen years, to only then decrease (Brookman and Thistle, 2009). Brookman and Thistle (2009) concluded that corporate governance does function as reasonably expected, and that CEO age, tenure, retirement and corporate performance do act in tandem, as described above.

CEO Gender

Several studies suggest that compared with men, women are less likely to participate in corrupt practices (Cheung and Hernandez-Julian, 1999; Swamy *et al.*, 1999). Byrnes, *et al*., (1999)

observed that in different activities men were more willing to take risk than women. Sundén and Surette (1998) and Bernasek and Shwiff (2001), documented that women are considerably more risk averse than men. In a study on betting behaviour of men and women by Bruce and Johnson (1994) and Johnson and Powell (1994), it was observed that women show a lesser inclination towards risk-taking than men.

Consistent with this previous research, the results here show a very significant negative coefficient for **CEOGEN** in **Model 4, 5** and **6** (β=0.94, z=3.28, p<0.05). This shows that the CEO gender of the UK-based cartel firms has a very significant negative impact on the number of convictions on cartel formation. In fact, the impact of CEO gender was the highest value coefficient discovered in any of the regression models. Therefore, we accept **P11**: *that there are less female CEOs represented in cartel firms, compared with non-cartel firms.*

Multiple-Directorship

In all previous models the coefficient for multiple directorships; **Multidir** is found to be negative but statistically not significant. Therefore, we cannot accept the proposition **P12:** *that board of directors of cartel firms are less likely to have directors who work on other boards, compared with boards of directors of non-cartel firms.* However, the results suggest that the number of cartel formation and discovery in UK-based firms reduces as multiple directorship increases. These results are consistent with prior research where illicit activity is being modelled alongside corporate governance variables (Gilson, 1990; Kaplan and Reishus, 1990; Brickley *et al.,* 1999; Shivdasani, 1993; Ferris *et al.,* 2003). The results of these authors show that boards of directors of firms committing fraud are less likely to have directors who work on other boards, compared with boards of directors amongst non-fraud firms. Although multiple directorships as a variable appear to reduce the formation of cartel as evidenced by its negative impact on the number of convictions for cartel formation, its impact appears to be only a minimal one.

CEO Concentration Power

The coefficient for the concentration power variable (**BOSS**) was found to be positive and statistically different from zero in estimating its influence on cartel formation and discovery (**CONV)**, given other predictor variables in all models (β=0.83, z=2.80, p<0.05). This positive figure shows that concentration power increases incentives to commit cartel crime given that the number of cartel formation and discovery increases with an increase in power concentration. Therefore, we reject the null hypothesis that the coefficient is not significantly different from

zero at the 5% level of significance. This is consistent with prior studies, which discuss the case of fraud in general (Loebbecke *et al.*, 1989; Jensen, 1993). Hence **P13** is accepted, *that firms committing cartel are more likely to have CEOs who also have a dual role serving as board chairs.*

Both **CEOCASE** and **CEONUM** variables are significant for how they both made very noteworthy contributions to explaining the variability in the data. For all models without the inclusion of the number of cartel cases or cases of misconduct, the pseudo-R2 is under 0.3. Although the value of pseudo-R^2 is not to be compared with R^2 in ordinary logistical regression, the values of pseudo-R^2 do have a comparative value used in the same data set for comparing the effects of individual variables on data variance. Hence, only by including CEO cases and CEO misconduct cases, on the part of the CEO, does the pseudo-R2 value reach towards or exceed 0.5, and in fact, the number of cases of CEO misconduct shows more ability to describe variance than cartel cases. This is to be expected when generally the number of misconduct cases will be greater than the number of cartel cases – the average number of CEO misconduct cases was in fact 1.75, and for CEO cartel involvement, 0.82.

Firm Sale

Surprisingly however, the average sales of firms three years pre-cartel (**SALEBA**) has an opposite sign to previous models. The **SALEBA** coefficient is negative but statistically insignificant. The robust standard error of the parameter is 0.008 and the p-value is 0.00. The negative coefficient suggests that the lower the average sales figure three years prior to the cartel formation, the higher the incentive to engage in cartel activity. These findings suggest that UK-based firms with healthy sales and income flow would find it less relevant to engage in collusive behaviour, such as price fixing and other cartel activities. However, although sale as a control variable appears to have a negative impact on the number of convictions for cartel crime, its impact appears to be negligible.

5.6.4 Board Characteristics, Ownership Structure and CEO Characteristics Estimation Results

The results for all the above models are used for board and CEO characteristics separately, and to have a more realistic setting, model 7 includes both board and CEO characteristics jointly.

Table 5.9- Board and CEO Characteristics - Ordered Logistic Estimation Results

The table reports the results of ordered logit regressions of a dummy variable equal to the prior incidence of cartel formation and discovery (*CONV*). Thus, the value of 0 is assigned for the benchmark comparison with firms without any involvement in cartel activity, referred to here as non-cartel firms. It means that the firm has not formed any cartel, nor had been discovered for any cartel activity, 1 if it was a first-time conviction, 2 if it represented the second conviction, and so on, in this cartel formation and discovery as dependent variable on a number of financial and corporate governance variables for the sample of mainly UK-based cartel firms and matched non-cartel firms. For every cartel firm, a control group of non-cartel firms was created, which share the first three digits of the SIC code and similar firm size based on net sale within ±25% of the cartel firm's sales at the end of the year before the collusive agreement started. Firm-years, in which cartel firms, i.e., firms that at one point in time during our sample period are part of a cartel agreement, are not participating in a cartel, are excluded from this analysis. *Sizeba* is the size of the board pre-cartel formation. *NED%* is the percentage non-executive directors on the board pre-cartel formation. *Ageba* is the age of the board before the cartel formation. *GENBA %%* is the average gender ratio of the board pre-cartel formation. *Durba* is the duration of the board pre-cartel formation. *Remun* is the board remuneration pre- cartel formation. *OUTOWN %* is the common stock owned by outside directors on the board pre-cartel formation. *FAMCON* is a dummy variable, which equals 1 if the firm is family owned and controlled; 0 otherwise. *CEOAGE* is computed as the age of the CEO at the starting year of the cartel formation. *CEOTEN* is computed as uninterrupted years on the board of directors up to the year when the cartel started. *BOSS* is a dummy variable for cartel firms created with a value of 1 if the chair of the board held concentration power of CEO or president and 0 if otherwise. *Multidir* is calculated as the total number of directorship assigned to the CEO on other boards. *HHI* is the Herfindahl-Hirschman Index. *DoJ* is a dummy variable with value of 1 is assigned when the firm is found to have committed a cartel criminal infringement in the jurisdiction. *Saleb* is the average sales pre-cartel formation. *CurrRatioB* is the average of current ratio pre-cartel formation. *PPER* is the average poor financial performance pre-cartel formation. *COSTA* is the firm's ownership status to control for private firms and public firms. *UK* is a dummy variable took value of 1 if the firm based in the UK, 0 otherwise. *JOIN* is the number of member joined the board during that period. The variables on board and CEO characteristics were obtained from proxy statements with filing dates three years prior to the cartel agreements started. The equality of means is tested using a standard *t*-test and the equality of medians using a Wilcoxon signed rank test. ***, **, * indicates statistical significance at the 1%, 5%, 10% level.

Dependent variable: CONV (Formation and discovery)		**Model 6**	
Independent Variable	**Expected Sign**	**Coeff.**	**Z**
Board Characteristics			
Sizeba	(+)	0.12	2.35**
NED (%)	(-)	-2.51	-2.36**
AGEBA	(-)	-0.03	-1.49
GENBA % (%)	(-)	-0.96	-0.85
DURBA	(-)	-0.12	-0.70
REMUNR	(+)	0.03	3.02**
JOIN		-0.06	-1.94
Ownership structure			
FAMCON	(+)	-1.35	-1.68
OUTOWN (%)	(-)	0.58	0.96
CEO Characteristics			
CEOage	(+)	0.05	2.88**
CEOTen	(-)	-0.08	-1.51
Multidir	(-)	-0.18	-1.91
BOSS	(+)	0.96	2.54**
Control Variables			
COSTA		1.25	3.85**
Saleba		0.00	1.72
PPER		-0.00	-2.41**
CurrRatioB		-0.36	-1.97
HHI		1.85	2.34**
DoJ		1.44	2.63**
UK		-0.34	-0.89
Industry effect		Yes	
Year effect		Yes	
Number of Obs		**213**	
Pseudo R2		**0.258**	

Source: Author's own calculation

Table 5.9 above illustrates the results obtained using model 7. Similar to the previous models after including all board and CEO characterises, the figure shows a positive and significant coefficient in board sized (**SIZEBA),** CEO age **(CEOAGE) and BOSS** variables, the results also show a negative and significant coefficient in the average age of the board (**AGEBA),** non-executive directors **(NED %),** members joined **(JOIN),** CEO gender **(CEOGEN),** and multi-directorship **(MULTIDIR).** However, remuneration (**REMUNR)** shows a positive coefficient, yet is not significant. After replicating the analysis with all the characteristics, the results prove to be robust, as shown by the previous models.

5.6.5 Marginal Effects

In order to measure the relative impact of the board and CEO variables on the occurrence of cartel formation and discovery, the marginal effect is generated for all variables from model 7. Table 5.10 shows the results.

Table 5.10 Marginal Effects of Independent Variables Displays of Ordered Logistic Estimation

The table report the effect of one standard deviation % change in the cartel formation and discovery (***CONV==1***). Marginal effect can be interpreted as the change in the probability of cartel formation (formation and discovery) for each unit change in the independent variables. These effects are computed based on the independent variable's mean value from model 6 above. The dependent variable is the cartel formation and discovery (*CONV*). Thus, the value of 0 is assigned for the benchmark comparison with firms without any involvement in cartel activity, referred to here as non-cartel firms. It means that the firm has not formed any cartel, nor had been discovered for any cartel activity, 1 if it was a first-time conviction, 2 if it represented the second conviction, and so on, in this cartel formation and discovery as dependent variable on a number of financial and corporate governance variables for the sample of mainly UK-based cartel firms and matched non-cartel firms. *Sizeba* is the size of the board pre-cartel formation. *NED%* is the percentage non-executive directors on the board pre-cartel formation. *Ageba* is the age of the board before the cartel formation. *GENBA %* is the average gender ratio of the board pre-cartel formation. *Durba* is the duration of the board pre-cartel formation. *Remun* is the board remuneration pre- cartel formation. *OUTOWN %* is the common stock owned by outside directors on the board pre-cartel formation. *FAMCON is* a dummy variable, which equals 1 if the firm is family-owned and controlled; 0 otherwise. *CEOAGE* is computed as the age of the CEO at the starting year of the cartel formation. *CEOTEN* is computed as uninterrupted years on the board of directors up to the year when the cartel started. *BOSS* is a dummy variable for cartel firms created with a value of 1 if the chair of the board held concentration power of CEO or president and 0 if otherwise. *Multidir* is calculated as the total number of directorship assigned to the CEO on other boards. *HHI* is the Herfindahl-Hirschman Index. *DoJ* is a dummy variable with value of 1 is assigned when the firm is found to have committed a cartel criminal infringement in the jurisdiction. *Saleb* is the average sales pre-cartel formation. *CurrRatioB* is the average of current ratio pre-cartel formation. *PPER* is the average poor financial performance pre-cartel formation. *COSTA* is the firm's ownership status to control for private firms and public firms. *UK* is a dummy variable took value of 1 if the firm based in the UK, 0 otherwise. *JOIN* is the number of member joined the board during that period. The variables on board and CEO characteristics were obtained from proxy statements with filing dates three years prior to the cartel agreements started. The equality of means is tested using a standard *t*-test and the equality of medians using a Wilcoxon signed rank test. ***, **, * indicates statistical significance at the 1%, 5%, 10% level.

Model 7		
Independent Variable	**Z**	**Changes the pr(Conv==1) by y%**
SIZEBA	2.18**	0.024
AGEBA	-1.46	-0.006
GENBA % (%)	-0.82	0.186
DURBA	-0.70	-0.019
NED (%)	-2.75**	-0.643
REMUNR	2.67**	0.002
JOIN	-2.49**	-0.150
CEOTEN	-1.45	-0.016
CEOAGE	2.74**	0.010
MULTIDIR	-1.78	-0.036
BOSS	2.75**	0.170
OUTOWN (%)	0.96	0.113
FAMCON	-1.98	-0.263
Control Variables		
COSTA	4.19**	0.231
PPER	-2.16**	-0.001
SALE	1.63	0.000
CURRRATIOB	-1.94	-0.070
HHI	2.28	0.358
DoJ	3.70**	0.171
UK	-0.95	-0.064
Industry effect	Yes	
Year effect	Yes	
Obs	**228**	

Source: Author's own calculation

The effect of one standard deviation change (**CONV**==1) is reported in the table above. Marginal effect can be interpreted as the change in the probability of cartel formation and

discovery for each unit change in the independent variables. These effects are computed based on the independent variable's mean value.

Model (7) shows that one unites change in the board size (**Sizeba**) leads to an increase in the probability of cartel formation by 2.4%. The percentage of non- executive director (**NED %**) has the largest marginal effect; where one unites increase in non- executive director **(NED %)** lead to a -64.3% decrease in the probability of cartel formation. Besides, one unites increase in the percentage of board remuneration (**Remun**) leads to a 0.2% increase in the probability of cartel formation. Moreover, one unites increase in (**JOIN**) the number of member joined the board lead to a -15% decrease in the probability of cartel formation.

Furthermore, the CEO concentration power (**BOSS)** variable result shows that a one unit increase in **BOSS** leads to a 17% increase in the probability of cartel formation. The CEO gender (**CEOage**) in addition, shows that a one unite increase in **CEOage** leads to a 1% increase in the probability of cartel formation (**CONV==1**).

The current ownership status of the firm (**COSTA**) has a positive impact on the number of incidences of cartel formation and discovery; one unites increase in (**COSTA**) leads to a 23% increase in the probability of cartel formation. Additionally, the poor performance of a firm (**PPER**) one unite decrease in (**PPER**) leads to a 1% increase in the probability of cartel formation (**CONV==1**).

5.6.6 CEO Compensation Estimation Results

Top management levels are responsible for taking the decision of forming cartel and then imposing this decision upon the management of the organisation who strives to hide any kind of collusive agreement (Harrington, 2006a). Many compensation schemes are provided to the top managers and it is necessary to understand if these schemes may help in facilitating the collusive behaviour. The above results prove that there is a strong association between CEO characteristics and cartel formation and discovery; therefore, the following sections examine the relationship between the CEO compensation package and the incidence of cartel formation and discovery. Due to the availability of the data the observation number shrunk to **92** firms (**46 cartel firms and 46 non-cartel firms**). Therefore, Binary regression (logistic model) is used for CEO compensation. **The dependent variable** is **cartel** formation and discovery **(Cartel**), is a

dummy variable which takes the value of 1 if the firm participated and discovered in cartel agreement, and 0 otherwise. The table below report the results obtained for model 8, 9 and 10:

Table 5.9- CEO Compensation- Logistic Estimation Results

The table reports the results of logit regressions of (**Cartel**) dummy variable of whether a firm participates in a cartel agreement or not, in this cartel as dependent variable on a number of corporate governance and financial variables for the sample of mainly UK-based cartel firms and matched non-cartel firms. For every cartel firm, a control group of non-cartel firms was created, which share the first three digits of the SIC code and similar firm size based on net sale within ±25% of the cartel firm's sales at the end of the year before the collusive agreement started. Firm-years, in which cartel firms, i.e., firms that at one point in time during our sample period are part of a cartel agreement, are not participating in a cartel, are excluded from this analysis. *CEOTEN* is computed as uninterrupted years on the board of directors up to the year when the cartel started. *BOSS* is a dummy variable for cartel firms created with a value of 1 if the chair of the board held concentration power of CEO or president and 0 if otherwise. *Bonus* is calculated as the average three-year CEO bonus. *Share* is calculated as the average three-year CEO shares in the firm. *Tcomp* is calculated as the total average three years CEO compensation in the firm. *HHI* is the Herfindahl-Hirschman Index. *PPER* is the average poor financial performance pre-cartel formation. *UK* is a dummy variable took value of 1 if the firm based in the UK, 0 otherwise. The variables on CEO characteristics and compensation were obtained from proxy statements with filing dates three years prior to the cartel agreements started. The equality of means is tested using a standard *t*-test and the equality of medians using a Wilcoxon signed rank test. ***, **, * indicates statistical significance at the 1%, 5%, 10% level.

Dependent variable: Cartel		**Model 8**		**Model 9**		**Model 10**	
Independent Variable	**Expected Sign**	**Coeff.**	**Z**	**Coeff.**	**Z**	**Coeff.**	**Z**
CEOTEN	(-)	-0.28	-3.24**	-0.22	-2.70*	-0.26	-3.34**
BOSS	(+)	0.11	0.18	0.30	0.37	0.19	0.36
Bonus	(+)	0.07	2.28**				
Share	(+)			0.14	0.91		
Tcomp	(+)					0.00	2.36**
Control Variable							
PPER		-0.23	-0.75	-1.38	-1.17	-0.89	-1.21
CURRRATIOB		-0.13	-0.19	-0.29	-0.45	-0.23	-0.40
HHI		3.24	1.44	2.14	0.86	2.56	1.11
UK		0.83	1.00	0.86	0.93		
CONSTANT		1.73	1.18	1.89	1.66	1.40	1.18
Number of Obs		**84**		**84**		**85**	
Pseudo R2		**0.318**		**0.312**		**0.329**	

Source: Author's own calculation

CEO Tenure

Similar to the previous results on CEO tenure the comparison model shows that the CEO tenure coefficient **CEOten** used in models 8, 9, and 10 is negative and significantly different from zero in estimating cartel formation and discovery **(Cartel).** The results indicate that the number of years the CEO has served as director for UK-based cartel firms is actually less than non-cartel firms.

CEO Compensation

The share variable (**SHARE)** indicates that the effect is not large. Based on the total compensation (**Tcomp**), the null hypothesis that the coefficient is not significantly different from zero can be rejected. There is therefore a significant difference in the total compensation and bonus between the cartel and non-cartel groups. It therefore rejects **P15** - *that the average CEO share for cartel firms is higher than non-cartel firms* and accepts **P14** and **P16** – *that the average CEO bonus for cartel firms is higher than non-cartel firms* (**P14**) *and that the total CEO compensation for cartel firms is higher than non-cartel firms* (**P16**). These are consistent with the literature, that the CEOs of firms with weaker governance (where cartelisation) is possible structures receive greater compensation (Core *et al.*, 1999). These are also consistent with the notion that compensation packages help enhances the collusion (Spagnolo, 2000).

5.7 Chapter Summary

This chapter reports the results of empirical findings on the association between three sets of variables, i.e. board composition, CEO characteristics, and CEO compensation and cartel formation, over the period 1990 to 2008.

Two types of analysis are performed, univariate and multivariate, to analyse the sample of this research. The univariate test applies the T test. The multivariate analysis adopts a regression analysis. Overall, the estimation results show relations between CEO tenure, CEO age, CEO gender, the concentration power of the CEO, size of the board, the duration of the board, the percentage of non-executive director and CEO compensation, in respect of the likelihood of cartel formation and discovery amongst otherwise matched firms where market and legal environmental controls are also modelled.

The ability to co-ordinate cartel activity would seem to be affected by past experience of the CEOs. Whenever, **CEOCASE** and **CEONUM** are each added to the models 6 and 7 concerned with CEO characteristics, both values have strong and significant positive effects on the likelihood of raised incidences of cartel formation and discovery. Past CEO history can be a guide to future proclivities to cartel formation. In other words, cartel activity, if it is not a habit, is an ingrained response by some CEOs to the problems of financial, market, and economic uncertainty, at the very least. In fact, the pseudo-R^2 value when these two variables are added to the model rises considerably and doubles, approximately, compared with CEO-based models without board characteristics, or CEO and board characteristics together, without **CEOCASE** and **CEONUM**. In logistic regression there is no direct equivalent to the R-squared found in ordinary least squares regression but pseudo-R^2 values can play a similar role (if technically there are different from OLS types, and there are various pseudo-R^2 techniques. In this study, **CEONUM** and other CEO characteristics can themselves account for a great deal more variance than other models, either CEO variable without **CEONUM**, or combined CEO and board characteristics. This means that the history of the CEO can be a critical factor in determining future cartel activity.

In the next chapter, a discussion of corporate governance and cartel is presented, alongside ownership concentration in cartel formation, compliance code needs vis-a-vis cartels, and corporate anti-cartel compliance programme.

Chapter Six

Discussion

This chapter presents and discusses the results reported in Chapter Five in an effort to provide an answer to the research question identified in the first chapter. Those results relating to the relationship between cartel and corporate governance are discussed first; followed by a discussion on cartel and the compliance code needs and the corporate anti-cartel programme.

6.1 Corporate Governance and Cartel Formation

This study has investigated by empirical means across a controlled and matched set of data just what attributes of corporate governance can significantly mitigate the likelihood of cartel formation. Many of those attributes in each of the models with negative co-efficient have been shown under their specific modelling conditions to have a significant empirically measurable effect on desisting from cartel formation.

This study is part of the developing empirical based 'technology' of corporate governance, whereby empirical research is done precisely on soft system analyses of corporate governance. This study extends these kinds of research in a new direction, to the applicability of an empirical study of corporate governance and cartel formation, based on individual and group attributes. Much of the reason for these sorts of developments in corporate governance has been driven by the new importance of risk management in almost every sphere of corporate activity, but especially as risk management exists to mitigate the risks of illicit activity. This particular potential use of the study will be developed in the recommendations section.

This research aims to find if there is a link between corporate governance characteristics and cartel formation in UK-based cartel firms. The cartel data set consists of 150 cartel firms, where 114 firms are from the UK. These firms have formed cartel and discovered in 52 cartel cases that operated in all around the world, and were found guilty by DoJ, EC, and OFT/CC between 1990 and 2008.

A cartel in general is a management response to a challenging set of economic and technological circumstances. Typically in the past, the response has been described by more econometric and structural arguments. The cartel emerged from economic pressure. These forces are still of

course to be acknowledged as prime, and cannot be discounted or minimised. However, this study, after controlling for market and legal environment, also focuses on how human and organisational factors are likely to either aggravate or mitigate the formation of a cartel. Chapter Five describes in detail just how such factors can and do have significant influence on the likelihood of cartel formations and discovery.

In the contemporary period, the opportunities and the potential benefits of cartel formation have only increased, given the modernisation processes that globalisation has introduced across the globe, along with vast information exchange (Hüschelrath and Weigand, 2010). The relationship between corporate governance and market competition which was discussed in Chapter Three confirm that market information and new opportunities for hidden communication after all are the basic requirements for a cartel to even become possible (e.g. Keasey *et al.*, 2005; Van Frederikslust *et al.*, 2008; du Plessis *et al.*, 2011; McCahery, 2002; Januszweski *et al.*, 2002). In any economic downturn, it is likely that the incentives for cartel formation will only increase (Lipczynski and Wilson, 2001). In the context of the current global competition, it is becoming clear that international competition has risen in complexity well beyond the degree that most economists can cope with in their models and, generally speaking, in their understanding (Grossman, 2004).

The period covered by this study, 1990–2008, according to management guru Peter Drucker, saw the beginning of a transformation of society and business culture into an era when *"people don't understand the world anymore, and the past is not sufficient to explain the future"* (Childress and Senn, 1995: 3). Change is becoming less predictable and still unremitting. Firms are experiencing considerable rates of failure in strategic change programmes, threatening the survival of many firms in the headwind of globalisation. The pressure on CEOs and boards to navigate firms through this period of new competitive pressure has been intense.

New information technology and organisational factors including globalisation raised the potential and incentives for international and multiple project contacts between firms. These changes are still to be rationalised and described adequately in orthodox economic theory. In fact, Grossman (2004) argues that it is the new dynamics of strategic business management in a globalised market, including forms of corporate governance, that are driving these new economic and organisational structures, some of which may be opaque to regulators. Thus, the capacity of boards and CEOs to "game the system", which includes cartel formation, has raced ahead of the capacity of anti-trust authorities to follow and investigate (Harrington, 2006b).

Modern cartels can indeed have remarkably sophisticated organisational structures. The purpose of this sophistication is so that the corporate governance of the cartel can proceed with monitoring and punishment of the cartel's governance structures. How to adapt to these forces and new complexity in how cartels operate and disguise their activity is an increasing challenge to regulators, who now have to cope with the added complexity of international cartels in the globalised business environment. It has been emphasised that firms surviving the competition tend to possess optimal governance structures, and those who fail to adapt their governance structures to changes in the business environment are likely to lead to demise (Kole and Lehn, 1997). This assertion is a prelude for this study to focus on CEO and board characteristics as factors that can enable cartel formation and detection.

Certain CEO characteristics such as age, gender, tenure, remuneration, and dual executive-board roles exacerbate the likelihood of cartel formation. This is mirrored in the results showing that cartel firms characterised by having larger board size (**Sizeba**) compared to non-cartel firms; lower percentage of independent member (non-executive) (**NED %**); higher average board remuneration (**Remun**); less likely that cartel firm is owned and controlled by family; older CEOs represented on the board (**FAMCON);** having older CEOs represented on the board (**CEOage**); having CEO who served a less number of years as a director (**CEOten**); less likely to have a female CEO represented (**CEOgen**); more likely to have CEOs who's combined CEO-chairman position (**BOSS**); and a higher average of CEOs bonuses (**Bonus**) and compensation packages (**Tcomp**). All of these findings serve the purpose of cartel firms to persist in cartel formation.

Successfully adapting to an increasingly complex and highly competitive global market, straddling national and cultural boundaries, will indeed require regulators, to pay attention to *"diagnosing and changing organisational culture"*, including corporate governance (Cameron and Quinn, 2006). Most of the literature argues that successful firms those that have maintained profitability and higher than normal financial-returns are characterised by particular clear defined conditions.[2] These conditions involve obtaining (1) high barriers to entry, (2) Products/services which are non-substitutable, (3) large market share, (4) buyers and suppliers with low bargaining power, and (5) competition between competitors. (Porter, 1980)

[2] Discussed in details in Chapter Two

A focus on the ownership structure and composition of boards and the occupancy of the CEO, which are exactly the characteristics described in this study, could help identify some of the preliminary features of organisational structure which allow cartels to develop. The empirical study of cartel risk assessment is in fact growing, and this study is a step in that direction. This study is part of how "diagnosing and changing organisational culture" can be performed on an empirical basis in the direction of a growing threat of expanded international cartel operations (Cameron and Quinn, 2006). If board and CEOs cannot be held accountable for their own age and gender, it is still the case that shareholders, markets, and regulators may be interested in how a collective group of board members and the CEO can present a risk profile (which is high in terms of the formation of a cartel) or recidivist behaviour in cartel activity.

The likelihood for CEOs and board of directors to thrive financially in cartel firms is seen in the fact that firms collude together in order to maximise profits and maintain their price, suggesting that they are also likely to have good financial performance (Spagnolo, 2005). Boards and CEOs who view cartel as a protector of firms and of sector stability, more than as a potential source of artificially inflated profits, may well be more the contemporary rationale for cartel formation (Connor and Helmers, 2007). The benefits that CEOs and boards of directors obtain from their positions in cartel firms are confirmed by the findings that the board remuneration (**Remun**) for these firms is higher than for non-cartel firms.

The ideal step is to discover where corporate networks between CEOs and boards are actually fixated on the classic hard-core cartel manipulation of price, supply and market share (Grossman, 2004). What this study has demonstrated is that CEO and board characteristics have a potentially important role to play in helping identify what kinds of attributes attached to corporate governance can actually add to the likelihood of cartel formation and cartel activity. This indeed would be valuable information. Therefore, to model cartel risk assessment, which would generally include econometric data, the board and CEO characteristics can be meaningfully attached to a more expanded and still empirically driven basis.

The inclusion in this study of poor financial performance (**PPER**) and ratio of assets to liabilities (**CurrRatioB**) has been used for control purposes to focus with empirical precision on board and CEO characteristics, whilst not ignoring the influence of econometric data. Thus, given how the data have been matched and controlled for the information on age, gender, tenure, board structure etc., can potentially improve the accuracy of explaining how and why cartel activity begins.

Before cartel scandals erupted, studies concluded that as expected, institutional investors and financial analysts did not assess firms solely on financial performance criteria. Rather, they also based their judgments on prognoses about the boards and CEOs on human resource management factors influencing the success of the firm. It is worthy of note that lack of apparent relationship is found between the financial performance of the firm and implementation of several directorships (Kiel and Nicholson, 2006).

Where does the value of a board and CEO lie, and how can criteria be established for making such assessments in relation to cartel avoidance? What might this mean for identifying scenarios where boards or CEOs are more likely to commit to cartel formation as a brand of strategy, and of colluding with competitors against the consumer? Can the quantitative study of different board and CEO attributes contribute to an assessment of the latent value of a corporate governance structure? Would firms, noting the outcome of a study such as this, take responsibility and demonstrate some measures of accountability by adapting its CEO and board personnel to lower the risk of cartel activity? Would some compendium of all of the negative co-efficient characteristics (e.g. **CEOgen**, **NED%** etc) finally be added to the list above? The prospect seems unlikely but there is after all a growing body of evidence that certain corporate arrangements of CEOs and boards is more likely to produce illicit activity, and the costs of illicit activity are growing considerably. Regulatory measures are increasing, but there are more intangible costs such as reputational damage. Commentators after the collapse of the case against BA apparently left the court with their "reputations unsullied" (Joshua, 2010). Such a situation is unlikely to be repeated, and the prosecution in US courts would almost certainly have led to considerable repercussions for all the reputations of the defendants.

A great deal of the informal leadership qualities and capabilities of CEOs and board characteristics enabling cartel formation can hardly be modelled empirically. The study found a direct relationship between communication of strategy by investor relations departments, and the ratings of analysts. All modern firms now realise that investor relationship is an important criterion for investing amongst investors. Stakeholders' relations have very much risen, and continue to rise in importance (Low and Siesfeld, 1998).

These matters of informal influence and communication are highly complex and difficult if not impossible to judge with certainty on an empirical basis. In the past, the tendency has been to answer such questions with the analysis of econometric measures that are quantifiable and

impersonal. The challenge of this study is that the personal attributes of CEOs and boards can make a significant contribution to the risk profile of a cartel being formed. This indeed would be to 'diagnose' organisational culture in a quite radical direction.

The link to economic benefits of diagnosing organisational culture with respect to cartel formation would be to lower the monitoring and agency costs of compliance with the law. At the radical end of action on cartel monitoring and investigation, firms with lower risk profile might be subject to less intrusive monitoring, or have taken action to lower their 'cartel risk' in terms of corporate governance, and greater leniency. Many types of experiments in cartel monitoring and investigation are being tried and have been discussed in this study. The fact that cartels are ongoing and maybe in fact increasing in number will itself spur new experiment in terms of corporate regulation. The US, UK and EU have all made considerable revisions to competition law in the past decade. Empirical research is the order of the day, and applying empirical research to cartels and corporate governance, even if the results may be difficult to interpret or implement in regulation, can hardly be ignored.

The rising tide of anti-cartel legislation across the globe has been consistently noted in this study. Any and all instruments for helping identify the likelihood of cartel activity will be welcome in an atmosphere where cartel prosecutions are becoming far more important. More resources are being dedicated to investigations, alongside some very public actions against cartels, including fines that have risen exponentially in value. The 10% of global turnover in fines must be a very considerable and galvanising threat for management against cartel formation (Alderman, 2009; Andreas, 2008). The US has certainly led the way in adding to the criminal basis and criminal sanctions against cartel participants, and the UK and EU have followed. Yet it is still the case, amidst all of these regulatory activities and new threats of fines and criminal punishment, that cartel activity is likely to have increased. As before, any and all means of analysing and explaining cartel formation could be a valuable regulatory and management tool. The rise in cartel activity and punishments cannot finally be good for the long-term economic welfare of the global economy.

However, in Norway for example, a new rule has been introduced into the corporate governance structure of every firm by national regulators. Corporate boards will have to have 40% female representation by force of law. According to the results of this study, this is bound to have an effect on cartel activity. Norway has experienced cartel activity (e.g. the cement cartel), and the new rule was not put in place as an anti-cartel measure, but as a social justice measure and a

commitment to the rights of women. However, this kind of radical action is expected to have significant benefits in terms of risk management since female participation at board level and senior management level has been found to inhibit illicit and fraudulent activity. In other words, a commitment to social justice via gender politics that also has risk management benefits may also add an anti-cartel effect to Norwegian corporate culture. The outcome remains to be seen, but the fact is that risk management and CEO and board attributes have become a normative mode of analysis of corporate governance.

It must be noted that the board characteristics that are linked to cartel formation and detection also necessitate the consideration of factors leading to how cartel have been formed in the first place. As mentioned earlier in Chapter Five, the dependent variable (**CONV**) distinguishes those firms that formed cartel (which are however detected) from all others firms; some of which are not in cartel, and others of which are in undetected cartel. The dependent variable in this case might decrease given the increased likelihood/attractiveness of cartel formation, which likewise makes cartel formation less attractive and hence making detection easier.

Despite the establishment of board characteristics in the study where some have been linked to firms that have been detected of cartel, the dependent variable is said to increase with the likelihood/attractiveness of cartel as indicated by the factors that lead to cartel formation. Factors that are likely to establish cartel are high seller market concentration, which is ushered by presence of entry barriers, number of firms, quality differences/ product differentiation, seller concentration, buyer power, and demand elasticity (Connor, 2008). In firms thus examined for the formation/existence of cartel, high seller concentration (**HHI**) appears to be a prevailing condition along with (product) homogeneity, which is usually considered an important condition for effective collusion. These factors are undoubtedly present within the market environment where both *cartel* and *non-cartel* firms operate in a high seller market concentration and the advantages that cartelisation provides might enable even non-cartel firms to commit cartel due to these. Both cartel and non-cartel firms operate in such environment, which would lead us to ask why non-cartel firms are not committing cartel despite the attractiveness posed by these factors. The assumption that might take place therefore is that these firms might in fact be committing cartel also but are not yet caught doing so; or that they might not be committing cartel at all. The only certain thing here is that cartel firms are committing cartel as shown by the evidence of their formal detection.

If *non-cartel firms* that have not been detected of cartelisation happen to commit cartel, an insightful position would be to look at the characteristics of the board that serve as the independent variable for this study; as there are findings establishing some board characteristics in cartel firms, which are not present in non-cartel firms (e.g., larger size of the board of directors; lower percentage of independent (non-executive) members; lower average age of board directors; higher board remuneration; higher CEO age; etc.).

Quantitative research has already shown that even for highly efficient firms, in industries where the concentration index **HHI** is high, a stable cartel is even likely (Prokop, 1999). The concentration index **HHI** with its positive correlation with **CONV** indicates how, as might be expected, with more concentration there are often fewer firms, and hence decision-makers involved in a cartel, making it easier for a cartel to form (Grossman, 2004). This expectation was also found to be correct in this study, with a considerable strength of effect. In all of the models, the **HHI** index had a strong aggravating influence on the likelihood of cartel formation. This result in all of the models also acts as a gratifying quality check for the data collection and model design processes.

Thus, good financial performance and apparently good corporate governance do not diminish the likelihood of cartel formation. Structural factors in the market are important, and these cannot be discounted (Aubert, 2007). However, this study has shown that board and CEO characteristics can and should also be added to the analyses of cartel formation, in both qualitative and quantitative fashions. These are matters of organisational culture and decision making, and the factors identified here certainly do not imply that the decision, or action, to implement a cartel arrangement is even rational or personal. The effect is still generic but cannot be ignored. For instance, the financial crisis may have a rationale in profit-making, but the group effect was highly irrational. Are cartels in fact always rational? Research by Asch and Seneca (1976) suggested that cartels based on seemingly simple profit motives may even defy their own aims, and in fact harbour an irrational strategy (Asch and Seneca, 1976). Other strategies, such as innovation, or bringing in new personnel, may have been superior. A cartel after all is a conservative response to a dynamic market environment.

Therefore, if it seems far-fetched to invoke CEO and board characteristics as the absolute focus of an anti-cartel compliance code, or of regulatory monitoring, the new and increasingly universal devotion to the arts of risk management is in effect only a major umbrella for the kind of analysis conducted here. Tenure has been studied a great deal, as discussed, and gender is

increasingly of interest. However, the co-efficient for CEO characteristics, gender (**CEOgen**) by far has the greatest inhibitory effect on cartel formation (-2.96, in model 4), and in terms of board characteristics, the percentage of non-executive directors (**NED %)** also had a very sizeable inhibitory effect (-3.40, see model 1). It is said that gender differences may not exist when seen in the context of corporate decision-making, and the reason is either the women would try to outdo men in terms of taking risk or since the decision would be made together by men and women, there could not really be gender difference in the decision made (Zahid *et al.*, 2006).

In an experiment conducted by Hamaguchi *et al.* (2009), gender was included as an individual or social background variable, in an experiment mostly designed to look for group size effects on cartel dissolution, along with leniency programme characteristics. The design of the research (which also proceeds by logistic regression), is very much alike the research pursued here in this study. There is certainly more attention being given to individual characteristics than ever before in the non-econometric analyses. Once more, the coefficient for gender in the logistic regression was significantly negative in showing that as well as women have a negative impact on cartel formation, women also have a positive impact on cartel dissolution ($p<0.05$), since "fewer men dissolved their cartels than women" (Hamaguchi, Kawagoe and Shibata, 2009). The fact of the matter is that gender can have as powerful an effect on cartel formation likelihood as the **HHI** concentration index, which seems a remarkable feature of the sensitivity of organisational culture to being diluted away from an '*old-boy*' network characterisation. This may not be a quantifiable statement on '*old-boy*' networks, but the evidence is still there in the regression analysis of data on gender influences controlled for market environment.). Another study by Byrnes *et al.* (1999) found that men are more willing to take risk than women, and this gender difference in risk taking decreases as age increases. However, no indication of difference in performance was noted despite the presence of risk-related behaviour difference between male and female fund managers in a study conducted by Niessen and Ruenzi (2006).

Moreover, the classic problems of principal-agent divisions of managerial responsibility, typified by aims and objectives dominated by personal gain, as well as profit maximisation, are in many ways inherited by the problem of a cartel. How a CEO and board (with certain characteristics) are more likely to assure their own personal gain and profit maximisation (including firm stability in difficult market conditions), through a cartel arrangement, can now be said to take place with some empirical precision, even if little is being said of the psychological and economic reasons for the cartel's formation. This research is neither economic (if it controls for

market conditions), nor psychological (which of course is unexamined) but certain definite attributes have been discovered which would be of some importance for the internal and external regulatory monitoring of cartel.

Tacit collusion between oligopolistic firms has been fairly well understood after decades of research on games theory (Friedman, 1971; Green and Porter, 1984). These analyses work with the 'standard' assumption that firms maximise discounted expected profits. The effects of observed managerial incentives on long-term (oligopolistic) competition, and how managers with a preference for "smooth time-paths of profits" [also noted in the literature as "income smoothing" (Loebbecke *et al.*, 1989)] can sustain cartels at lower discount factors, make the presence of a cartel arrangement less observable, and allow a cartel seem less of a criminal offence (Spagnolo, 2004 and 2005). The economic cycle can have a considerable effect alongside managerial incentives, together with the threat of being forcibly retired (discussed in Chapter Five). In the study of Buccirossi and Spagnolo (2007), the authors mentioned that a critical role is played by factors of corporate governance in determining a firm's behaviour towards competition as well as in identifying the key players in ascertaining anti-competitive behaviour.

The tied nature of an array of economic factors and CEO and board incentives cannot be ignored. There is no claim for isolating CEO and board characteristics as inherently influential on their own, but only those that can be distinguished in controlled circumstances. These characteristics can and will play a part in real world scenarios where cartel formation is likely.

In the real world, where strategic management and economic forces as part of globalisation are linked more than ever, it is the case that other organisational factors still influence a firm's objective function to generate a profit on behalf of its shareholders. Understanding the soft-system complexity is important to help understand how factors such as CEO characteristics, board characteristics and ownership structure can affect market behaviour, as well as how economic behaviour affects corporate governance. Corporate governance is said to comprise market competitiveness as an external mechanism, as pointed out by Lin (2001) in the literature review. The systems of corporate control and corporate activity under observation in this study are highly dynamic between market conditions and corporate volition. This is especially true given the prevalence of control and agency problems, when firms may follow objectives that are qualitatively and quantitatively different from the standard assumption of profit maximisation (Spagnolo, 2004).

Some portions of the control and agency problems of firms when they embark on cartel formation and take risk (such as a growing risk in the contemporary anti-cartel vendetta of the U.S DoJ, for instance) can now be explained by the distribution of CEO and board attributes analysed in the study. However, these characteristics are only generic and not liable so far to be part of any individual hiring practice assessment mechanism. Yet, like much of social change and corporate culture in general, such as the diversity management concept, matters that before were seen as irrelevant to corporate success, and merely the presence of liberal anguish, now appear as crucial elements of strategy in a globalised economy. What a CEO is, or what a board is, in terms of age, tenure and gender may be seen to be static and immaterial to future success compared with the incipient knowledge and experience held by CEOs and the board. However, what those characteristics also veil are tendencies, for and against, the formation of a cartel.

A cartel however cannot be communicated to investors or be broadcast as part of a strategy, as it is an illegitimate form of strategising, when stakeholders in corporate activities begin to include other competitors acting illegally as conspirators. Therefore, a cartel is an organisational culture in direct opposition, or standing in contradiction, to what most business commentators and analysts today identify as best corporate governance and strategic practice - meaning transparency and accountability. Transparency and accountability are what enable the underlying reasons for corporate strategy, and help their enactment, thus enhancing CEO and board credibility. The quality of corporate strategy must be tied to communication - strategy is basically an outline of how a business will achieve its goals, usually by innovation and talented employees – but a cartel cannot be communicated. This must be why, at least partly, non-executive directorships inhibit cartel formation, since such directors are intrinsically more biased towards transparency and accountability, without heed to long-standing, more entrenched relationships in a firm. Hence, the percentage of non-executive directors (**NED %**), and the avoidance of concentrated power in organisational authority (**BOSS**), appear as distinctive inhibitors and aggravators of the likelihood for cartel formation.

It may be examined that the easiest and most visible characteristic of a board is its size. The board is supposed to summon experience and good judgement to all decision-making and supervisory functions at the highest level of strategic thinking in the firm. How can the larger board take a decision, or follow an action or strategy that is more likely to lead to cartelisation as is the case of the analysis here? Clearly, it is likely that cartel formation will be connected in some way to an intermediate term strategy. It is true that boards are being asked to perform more

functions and assume more responsibility. One empirically-based micro-perspective study on how boards actually 'do' strategy showed how boards may have very little interaction with daily organisational practices (Hendry, 2010). Boards often conduct only a reactive or procedural supervision around strategy (oversight and auditing functions). This is board management as 'board management by exception', that is, boards only act in exceptional circumstances. Otherwise, the board is merely a compliance overseer without much actual insight into the business and its detailed functioning. However, raising the profile and importance of this activity, particularly with regard to risk management, does today have a greater strategic importance, specifically in light of corporate governance scandals. There are only increasing demands on boards for oversight functions and board controls to have a strategic importance, and not to be mere passive vehicles of thin compliance checking (Hendry, 2010).Yet, enlarged boards may not be the answer.

The literature review emphasised that if cartel agreement can be considered a failure of corporate control, i.e. a failure of the board to control (e.g., CEO, individual directors), then it may be furthered that the likelihood of a firm to get into the cartel agreement is positively related with the size of the board (Gonzalez and Schmid, 2012). Board size (**SIZEBA**) used as a variable in two of the regression models both showed that significant differences existed between cartel and non-cartel firms, with the board size of cartel firms averaging around two more board directors than non-cartel firms, rather it is board quality, and especially the presence of engaged non-executive directors (**NED%**) which has the desired effect of determining cartel formation. OFT (2011) stated that directors in smaller firms might become more involved in day-to-day business practices of their firm, and might therefore be more knowledgeable of any actual or potential breach of competition law. In contrast, directors in larger firms might not be as involved as the directors in smaller firms. In a logit regression analysis of 75 matched firms characterised by fraud and no-fraud histories,

"no-fraud firms have boards with significantly higher percentages of outside members than fraud firms" and, "*as outside director ownership in the firm and outside director tenure on the board increase, and as the number of outside directorships in other firms held by outside directors decreases, the likelihood of financial statement fraud decreases"* (Beasley, 1996: 459).

Non-executive directors (**NED %**) maintain the integrity of their erstwhile contracts to perform monitoring function as part of corporate governance, and the concentration of CEO and board chairman roles (**BOSS**) exactly opposes the contractual independence proven to be necessary for

capable corporate governance in virtually all studies of the subject. In the literature, it is recognised that contracts with third parties may have important strategic effects on the quality of corporate governance. Many of the corporate governance variables discussed in this study, such as board remuneration (**Remun**) and CEO compensation (**Tcomp**), can be viewed as *"contracts with third parties from the point of view of competitors*" (Buccirossi and Spagnolo, 2007). In this regard, CEOs and boards are all third parties to be engaged variously by firms competing for the services of board members and experienced CEOs. This is part of the market in corporate governance, in terms of human resources.

A cartel exists to defeat or at least negate this form of contract that should exist within firms. Contracts with CEOs and board members should require these actors, in fulfilment of their corporate leadership roles, to usher the interests of one firm and compete with all other firms. The rational self-interest of economic activity should extend to governance and leadership. This is why the DoJ, EC, and CC/OFT all have strict rules about joint ventures and mergers, which may interfere with the self-interested structuring of market forces, from consumers to corporate entities. The doctrine of the corporate veil and that legal function assumes that the corporate form is acting as a single corporate entity. A cartel defeats or negates the doctrine of the corporate veil by veiling many corporate entities within a collective corporate entity that has in fact no legal status in corporate law.

The characteristics of the board and CEO which might function as markers for cartel formation would be white-collar criminals capable of expert networking at very high levels of corporate activity, and who are willing to become an offender, and often a re-offender, with the aim and objective of securing corporate gains that ultimately should benefit the said offender(s), but however, are deferred gains in terms of their own wealth and remuneration. This is the behaviour of a personality and group of people who appreciate the organisational culture of at least one industrial sector, and who are heavily invested personally, and even idealise, the status of their own firm amongst other firms within that sector.

Cartel is a defence of an industry as well as of a firm, against the interests of the consumer in general. In fact, cartel participants even over-identify with corporate culture and dis-identify with consumer culture. This may even help explain why aged CEOs (**CEOage**) with shorter tenure (**CEOten**) expectations may be more responsible for cartel formation than other older CEOs, since such CEOs may be about to depart from corporate culture after a long association. In the threat of departure, the potential comfort of a cartel as a point of identification with a

shared corporate culture amongst multiple firms may be more appealing. This of course is to verge on a psychological explanation of CEO characteristics. In this group of people, it makes more sense that corporate fines, and any other corporate sanction, will have less impact since these individuals are already identifying with corporate cartel culture, and these forms of punishment are an ordinary risk, rather than a critical risk, of corporate activity. This must help explain the difference in recidivism in the UK and U.S jurisdictions. In the UK, to abandon competition in favour of a cartel, on a number of occasions, already indicates the more normative identification of CEOs and boards with corporate versus consumer culture. This is clearly not the case with the aggressive and hostile pursuit of cartel activity by US authorities, where the corporate contract with the consumer, and never with other corporations, remains moral and ethical as well as economic virtue par excellence.

In fact, the negation of the erstwhile capitalist and free market contract with the consumer will thereby homogenise corporate governance around a hidden corporate 'cartel' structure. This is a strategy to defeat the conflict between firms by substituting the cartel agreement as the principal agent of agents. A cartel negates the point of view of other firms acting as competitors looking on at CEO and board contracts. In other words, the cartel defeats the market in corporate governance, or at least suspends the market in corporate governance for the duration of the cartel. Why should a market in corporate governance exist when it is understood that profits and market shares are already pre-determined in advance? Any movement at C-suite level between erstwhile 'competitor' firms during the operation of a cartel would seem an ineffective and even disruptive manoeuvre.

A cartel is a strategy that seeks to nullify strategy – this also helps explain why older and not younger CEOs seem to be more palatable to cartel formation, if older CEOs are strategically exhausted, and only have a network of contacts, an address book to put it crudely, as a strategy in difficult conditions. This research has indicated that C-suite transfers between firms are generally an inhibition on cartel formation (**JOIN**). A cartel is a stasis of strategy that is partly reflected in the individual characteristics of older CEOs with shorter tenure, and a lesser traffic in the market for corporate governance within a firm. The results from previous research on the role of outside directors in monitoring management and controlling agency problems suggest that a relatively large percentage of independent directors serve as a substitute for other types of monitoring mechanisms (Booth *et al.,* 2002). In the literature review, Rajagopalan and Datta (1996) examined any possible association between CEO characteristics and comprehensive industry conditions and found out that a limited role is played by industry conditions in tackling

differences in CEO tenure, educational background, and functional heterogeneity. Moreover, Booth *et al.* (2002) found that agency problems between management and shareholders played a role in motivations to add outside directors, or as this study agrees, **JOIN** had a negative co-efficient compared to raised cartel formation and discovery (**CONV)**.

In a scenario of denied contractual obligations to compete, the only strategic competitor to a cartel – since the consumer is now the enemy - becomes the regulatory bodies with direct supervisory powers of investigation, both commercial and criminal. Related to the question if C-suite movement between cartel members has any significance could be the question if movement between public and private entity personnel could have any influence on cartel formation. Thus, many of the recommendations of this study, as well as focussing on risk assessments as a new avenue of anti-cartel activity, will focus on regulation becoming more proactive. In this regard, the US DoJ has been and continues to be in the vanguard of anti-cartel criminal and civil procedures. However, there does remain room for more research in how to identify preliminaries that help the formation of cartels. The figures for cartel discovery suggest that there is still a great deal of room for improvement in detection rates.

In many ways, this study has complemented the work of Grillo (2002). Instead of focus on competition law and how market strategies are nullified by the "straightforward co-ordination on market strategies", the focus of this research describes how multiple firms design and practice an organisational culture in a cartel arrangement, or what Grillo calls *"an anticompetitive object"*. This anticompetitive object can more easily be reproduced amongst certain kinds of boards and with certain types of CEO – this is the conclusion of this research. In many ways, the obvious object is obtained and arranged by recruiting a CEO with a previous history of cartel formation and involvement. In fact, **CEOCASE** was more significant than **CEONUM** as seen by the difference in the coefficients in Models 5 and 6. In these models, CEO tenure, age, managerial position in respect of the chairman of the board being the CEO, and multiple directorships, are all the same, as well as the control variables. The difference is the addition of either the CEO's total number of cartel cases the CEO was involved in (**CEONUM)**; versus the CEO involvement in another cartel at the same time (**CEOCASE**). By the lower coefficient for the number of cartel cases, cartel cases have a raised effect compared to the number of cases per se. Past history is a guide to the future, and that previous involvement in cartel activity may well be an indicator of future involvement in cartel arrangements.

The research in part constitutes a profiling exercise. However, in criminal justice studies in general, the more focused the profiling technique is on individual offenders (including CEOs); the more controversial becomes the use of profiling. For instance, in light of recent events in the UK after the collapse of the cartel trial against British Airways (BA) for fuel surcharges, lawyers argued that "criminal cases should be selected based on the strength of evidence and not on the profile of the defendants" (Beaton-Wells and Exrachi, 2010).

Any use of quantitative (general spreadsheet, actuarial, or machine learning) techniques in gauging and understanding the behaviour of individuals is controversial. However, business culture is becoming more data-centric and analytical in its use of insights derived from the analysis of datasets. Best practice is increasingly focused on such insights often with more centralised control over decision-making. Boards and senior management would be the prime users of risk tools that invoke actuarial practices.

However, the conversion of data to the management of individual persons and contexts is contestable (Aitken *et al.,* 1996). Assembled data cannot and should not determine decisions on individuals, even in principle. The necessary appreciation of the dynamism of individuals supposedly cannot be recreated from collected data, no matter if the analysis is expert and adroit. Others argue that the level of accuracy of actuarial tools is too uncertain for estimating any individual's risk, especially in terms of offending rates (Hart, Michie and Cooke, 2007). This would include rates of cartel offences and the associated risks of cartel formation by certain CEOs.

The subject of this research thus will attract criticism as an inappropriate method for identifying the raised likelihood of cartel activity. Newer methods and uses of profiling may be 'interesting', but any method should be used according to its suitability for specific applications (Sampson and Laub, 2005). However, in the criminological literature, it has been more and more accepted, with more and more proof having been accumulated, that actuarial methods of offender profiling have greater accuracy than clinical (versus personal, and intuitive professional assessments done face-to-face). Statistical means can predict the likelihood of recidivism better than clinical assessments made by professionals (Veljanovski, 2011).

The fact that many **UK** firms are recidivist, and take part in multiple cartel arrangements at multiple times, might also suggest that some 'objective' quality of the corporate governance and organisational culture is persistent, and given over to abetting the formation of cartels. This may

of course be partly dependent on the market environment (the **HHI** index in particular), as well as the legal environment (the latter as a deterrent to recidivism, such as in the US), but the organisational culture and human resource selections of an organisation may be given to accommodate the possibility of engaging in cartel arrangements. Firms with given board and CEO characteristics in certain industries and market conditions have a latent tendency to cartelise competition. This reproduction of an anticompetitive object must indeed be facilitated by the human resource management of cartel firms, whether or not boards and CEO positions are publicly advertised, or whether the positions are filled with private sponsorship of known individuals (the old-boy network in classic terminology).

A truer measure of the ability of a board to get involved in a cartel arrangement, and access or consolidate market power, is the board's bargaining power, or the power of a board to bargain with others and demonstrate, and remonstrate, that a cartel is the necessary and sufficient condition for the economic welfare of all parties to the cartel (and even the consumer in the cartel of the crisis situation). The reason most cartel fail is due to new entrants outside of the cartel entering a market, and thereby disrupting the cartel to the point of breakdown (Grossman, 2004). Often, entry will be followed by an invitation to join a cartel, and without a successful conclusion to the 'bargaining problem' of new quotas, failure is more likely, but this is not labelled an entry problem per se, and is a bargaining problem. Therefore, for a cartel to be expected to last, the board, and CEO, plus any other organisers, must be capable of bargaining for its duration.

This is not to refer to the bargaining power of economic competition (with sellers and buyers bargaining over the best price for a product). This is instead to bargain over entry to a cartel, and for one firm to lever other firms into a cartel, even though other firms may judge that the potential 'price' they are paying (fines, loss of reputation, and criminal charges) is too high, compared to the promised benefit of raised or secured profits. Can cartels be treated as an investment? Schelling (1960) cites the example of an oligopolistic market whose apparent domination by the few using price leadership may in fact be an *"unprofitable distinction evaded by the small firms and assumed perforce"* by bigger firms. Smaller firms may well seek out differentiators that large firms eschew and instead opt for the supposed safety of a cartel and its pseudo-contractual commitment between competitors.

However, like an actual contract, a cartel arrangement is usually the "assumption of a' transfer cost,' not a real cost", and entry into a cartel by all of the interested parties does not remove the

"range of indeterminacy" that is the transfer cost of moving in or out of the cartel (Schelling, 1960). This is by knowing how to judge this transfer cost, which is usually a matter of significant CEO, board or senior management experience, operational influence control, and board monitoring processes. This is why both **CEOAGE** and **BOSS** were positive influences on cartel formation likelihood.

6.1.1 Ownership Concentration and Cartel Formation

Literature suggests that shareholder value is maximized through the authority and greater incentives of the larger shareholders. The larger owners have greater motivation as well as better opportunities than the smaller shareholder to exercise authority over the manager, according to the empirical evidence available (Jensen and Meckling, 1976; Zeckhouser and Pound, 1990; Burkart, 1997).

Further models have been created from the views of Jensen and Meckling (1976) regarding issues of ownership structure, and consider not just the extent of ownership of the firm insiders, but also the concentration of outside shareholders' holdings (**OUTOWN %**). The larger shareholders largely internalize the costs of supervision in addition to possessing adequate voting power to be able to have an impact on the corporate decisions which is why management is supervised better through them rather than the smaller shareholders.

Firm profitability is considered to be positively affected by the structure of ownership (Berle and Means (1932)). The expectations of the agency theory have been supported by other scholars in continuation of this debate (Jensen and Meckling, 1976). This includes the greater managerial incentives to diversify when ownership and control are separated as the managers are able to gain personal benefits due to risk diversification and reduction. This follows from the fact that managerial performance cannot be supervised by the greater number of shareholders. If the ownership was more concentrated (family firms) or if there was a single shareholder, managers would not have enough freedom to utilize firm resources (Shleifer and Vishny, 1997).

Diversification studies have shown that in product or market diversification, greater personal benefits including financial and reputational are acquired by the managers during product or market diversification due to risk aversion, empire building and expense preference (Thomsen & Pedersen, 2000). Greater shareholder value is created through ownership concentration which also offsets corporate diversification. The managers' tendency to increase their monetary status

and reputation through diversification and rapid development does not maximize the firm's market value, as the agency theory states (Jensen and Meckling, 1976). When the managers are not forced by the owners or external investors to meet the interest of the owners which is to enhance the firm's market value, they are not inclined to downsize or diversify in the reverse manner. According to the agency theory, the ownership structure hence determines the managers' tendency to increase firm value. Further examination of this theory was carried out by Amihud and Lev (1981), with the results confirming the view that investments in unrelated mergers and acquisitions were less likely to be made by the managers employed in firms that had large shareholders.

The systems of control that bring about an alignment of the managers' interests with that of the shareholders' is another aspect of corporate governance that is being studied. Ownership concentration (family firms for example) which includes risk and incentive efficiency trade-off is an example of such a control mechanism (Jensen & Meckling, 1976; Demsetz, 1983; Shleifer & Vishny, 1986). A greater motivation to supervise is possessed by the larger shareholders, which is why they need to compel the managers to bring their goals in line with their interests of enhancing the share value. However, when ownership concentration exceeds a certain degree, Fama and Jensen (1983) argue that managers get a chance to become entrenched and confiscate the minority shareholders' assets. The possibility of a non-linear association between firm performance and ownership concentration is hence being argued over by the scholars now.

Ownership concentration in firms does not necessarily lead to greater disclosure; however a positive and vital impact comes about through the composition of the board. There is a strong association between ownership concentration and quality of corporate governance in legal regimes that are weak, as has been suggested through the negative coefficient of law variable with the index of corporate governance. Ownership concentration hence becomes the method of resolution of agency conflict between the shareholders that are in control and the ones in minority when the investors are not given ample legal protection. Poor legal security then leads to ownership concentration (La Porta *et al*., 1999; Durnev and Kim, 2006).

Additionally, agency problems between the families in control and other shareholders may either aggravate or alleviate due to family control, which plays a significant role in addition to ownership concentration. Steijvers *et al*. (2010) puts forward the view that family-controlled firms are more likely to encounter agency problems. In such firms, the controlling family has the complete authority to appoint the members of its family to the board or management team

because of which it is able to attain maximum benefits for itself and have a low level of corporate transparency. In such situations, external monitoring is not favoured by the family-controlled firms so that the private interests of the family are protected, which is why low-quality auditors are hired (Niskanen *et al*., 2011a).

The results revealed in this study exhibits the concept of ownership concentration prevailing in cartel firms. This ownership concentration is understood within the context of a prevailing global competition where firms collude in order to increase their profitability and stability. Laiho (2011) has emphasised that the firm's resources might be extracted by dominant owners due to high ownership concentration. The firm's ownership structure may be taken into account with regard to this; as such structure enables ease of ownership concentration, as shown by high-ownership owners who use their position to obtain private benefit.

However, the formation of cartel is significantly and negatively influenced by the family firm (**FAMCON**) as the results shown in Model 2. The claim that family owners create enhanced governance and supervisory systems has been affirmed through this result. The agency problem between managers and owners can be lessened through family control which is why significant and negative effects of family shareholdings are obtained (Fama and Jensen, 1983). The large shareholders are better able to monitor the management compared to small shareholders. This is because large shareholders (family firms) internalise larger aspects of the monitoring costs and possess sufficient voting power in corporate decisions. Small shareholders, on the other hand, are only able to influence corporate decision making at a minimum basis. Because small shareholders have little influence on decision making, the managers then hold the control of the firm, who possess both the opportunities and incentive of misusing their position. It is therefore concluded that corporate performance would be adversely affected by the ownership-control separation (Laiho, 2011; Hamdani and Yafeh, 2010; Leech, 2001). According to James (1999), there is greater efficiency in investments as families possess a long term perspective on investment. When the shareholders have a long term view, the manager's tendency to take myopic investment decisions can be greatly reduced, as Stein (1989) asserts.

An explanation of this result could be as demonstrated in Chapter Five that the study sample is dominated by UK public firms, and according to Desender (2009) and Franks and Mayer (1997) who have argued that shareholder structures are fairly varied across countries, where frequency of dispersed ownership is seen in listed firms of US and UK, which means that several small shareholders are associated with the phenomenon of dispersed ownership and dispersed voting

power. When there is a wide distribution of share ownership, for example in the UK, the owners do have the motivation to become active owners and as their proportion of shareholdings is quite small; their voting power is quite weak which means that they can cause little influence on decision making (cartel formation), which makes the decision on the top management hands.

6.2 Cartel and Compliance Code Needs

Cartels have never been feared and loathed as they are often today. Before WWII and the height of cartel dominance, cartel governed roughly 40% of world trade (UN Department of Economic Affairs, 1947). Only since the post-WWII settlement, and especially with US economic dominance, have cartel been treated as more or less abhorrence to economic welfare. In Europe, Japan and Korea, cartel instead received a much more tolerant dispensation. Yet today, there is without question a *"hardening of attitude of competition authorities worldwide towards cartel"* (Whish, 2009). The US has always been uncompromising, the OECD has made major interventions in denouncing especially hard-core cartel. In Chapter Two, it has been shown that the number of cartel cases filed by the antitrust fell by 49% from 1990 to 2007, alongside the number of firms charged annually, which decreased continuously. The penalties imposed on convicted firms have increased however (Connor, 2008). In 2005, the EC set up its own dedicated Cartel Directorate and the UK has very recently loosened the criminal elements of its cartel offence to make prosecution easier. Furse (2004) for instance, contested the equivalence of cartel activity with theft, pointing to the voluntary participation of the customer, albeit on false information. However, the UK Enterprise Act's own intention was to make the analogy more accessible. The history of antitrust legislation in Europe itself has been "very much one of American influence" (Wils, 2005 and 2006).

The US value system around competition is that a "working competitive process is a precious public benefit that should be safeguarded" (Cseres, Schinkel, and Vogelaar, 2006). This is becoming more of a new norm, in the UK and EU jurisdictions, although resistance in the UK remains perplexingly strong. In a 2007 public survey, only a quarter of respondents 'strongly agreed' price fixing was even dishonest, and fewer than ten percent felt criminal prosecution and imprisonment was then an appropriate punishment (Stephan, 2008a). Another problem is how the EC still remains inconsistent and excessively secret as to how fines and penalties, especially in regard of leniency measures, finally affect outcomes (Veljanovsk, 2011). For instance, one of the worst recidivists, Akzo Nobel, received complete immunity in the Calcium Carbide cartel despite involvement in four previous cartels. Akzo similarly received full immunity in the

Sodium Chlorate cartel discovery but once more, past cartel infringements were not presented as aggravating circumstances deserving of exemplary punishment. Vafeas (2003) also worryingly found that *"the audit committee is mostly regarded as a compliance committee".* Where the number of outside directors is limited (**NED%** is low), new directors are likely to go on the audit committee and remain in the committee for an extended period of time. This expectation and restriction of choice may well lower the quality of monitoring independence so that a more passive compliance, rather than proactive auditing, may be the norm (Vafeas, 2003).

This finding in fact may have implications for the monitoring of a compliance code for cartel activity. The audit function of the initial risk assessment and identification process might experience the same problems as other auditing bodies when committee membership defaults to longer tenures. The committee should have as wide a body of participants as possible, including outside directors, with change on a regular basis. The tenure of the audit committee thus shares some aspects of the result for CEO tenure, and this change guards against cartel formation.

Being proactive in anti-cartel is first of all being aware of either regulators or board members. The "paramount problem" around optimising an oligopolistic market structure is "*to devise and maintain communication systems that permit behaviour to be co-ordinated in the common interest"* (Scherer and Ross, 1990). This communication will solve the two working problems of co-ordination on price, and enforceability of arrangements in order to stop cheating and 'chiselling' (Symeonidis, 2002). Social ties and a 'homogeneity of values' can foment collusion and make design, co-ordination, and cartel agency problems more easily solved (Symeonidis, 2002). An infamous example of board level conviviality producing a cartel was the Gary Dinners that made for an American steel cartel in the early 20th century, which made cooperation between affectionately known *competitors "more binding… than any written or verbal contract"* (Scherer and Ross, 1990).

As noted in §2.10, the forces and motivations between internal corporate incentives and market conduct are very complex. Yet, displaying and communicating control over corporate governance and internal controls is now a very desirable and incentivised corporate goal. These forces and motivations have been particularly studied in the context of strategic delegation, but much less with respect to cartel practices. In particular, if shareholders also may benefit from collusion, the question of shareholder responsibility in inducing collusive agreement arises. This study has not investigated these kinds of effects.

The literature on cartel formation and collusion more generally has consistently underestimated the importance of channels and skills in communication that assist the formation and sustainability of cartel. Economics is mostly concerned with equilibrium outcomes, and not the dynamic organisational structures and paths of communication by which equilibrium becomes more likely through exchanges of information. By contrast, this is exactly the type of analysis called for in legal proceedings investigating collusion. There is a pronounced gap between the theoretical quality of economics and the practical matter of establishing accountability and attributing responsibility (Grout and Sonderegger, 2005). This gap may well be one reason why the frequency of prosecution in some jurisdictions, such as the **UK**, has been lamentably low.

The fact that the authorities are now more willing to pierce the corporate veil in pursuit of executive connected to cartel operation is a significant step that firms and executives must bear in mind with care. The new willingness to pierce the veil is most noticeable around bribery and fraud activities. For instance, consultancies are not establishing more and more supervisory and internal audit controls to help with information accuracy, comprehensiveness, and currency, and hence with regulatory compliance.

Ernst and Young's (2012) report, *Global bribery and corruption fraud risks*, describe how the Securities and Exchange Commission (SEC) recently settled a civil action against a retailer after two executives were charged in connection with bribery at Brazilian subsidiary, when customs officials were bribed. While the two executives had no direct supervisory role and absolutely no operational connection to the subsidiary, and hence had no connection to the improper payments, the SEC argued that both executives failed to comply with the rigorous terms of the Foreign Corrupt Practices Act (FCPA), simply by failing to ensure a sufficient level of internal control (Young, 2012). Could there be a system of internal control that may be expected to police and act as a deterrent against the risk of cartel formation? This study has made a contribution to understanding how, and in what comparative measure, CEO and board characteristics do contribute to cartel formation likelihood.

Research such as this is also being pursued in a wider geographic frame. In China, where corruption and poor corporate governance have been increasingly recognised, new studies have shown that board characteristics play a vital role in assuring good corporate governance (Gulzar and Wang, 2011). Studies have found, as here, that there are significant and positive correlations between management earnings and CEO / chair concentration power (**BOSS** in this study), board

meetings, female directorships (**GENBA %** in this study) and concentrated ownership (**FAMCON** in this study) (Young, 2012).

Fama's (1980) well-known analysis of the principal-agent problem dispensed with the presumption that a firm has a distinctive set of owners, in any definitive sense. The legendary roles of the 'entrepreneur' and of the strong guidance of an owner-leader should also be contained for the purpose of analysing modern corporate entities of considerable size and complexity. The two functions usually attributed to the entrepreneur - management and risk bearing - are taken as naturally *separate factors "within the set of contracts a firm is called"* (Fama, 1980). The firm is disciplined by competition from other firms, and this competition spurs the evolution of management devices (and risk tools) for efficiently monitoring the performance of the corporate board as well as the CEO. Individual participants including the CEOs and outside directors, as well as managers, are presented with both disciplinary measures and opportunities by markets vying for their services, and this form of competition is transmitted into the firm from without, to operate within the firm (intra-firm competition) as well as outside it (inter-firm competition) (Fama, 1980).

This is apparently critical since cartel competition exists to nullify first of all, by definition, inter-firm competition. However, this research has shown that inter-firm competition may be highly significant in protecting against the risk of cartel formation. That is, female CEO **(CEOgen)** and a higher percentage of non-executive directors (**NED%**) can present an anti-cartel, competitive effect, in terms of corporate governance, against the constellation of an aged CEO (**CEOage**) with not a great deal of tenure (**CEOten**) left, in all likelihood, who is capable and prepared to organise a cartel. This study would support the notion that internal competition over corporate governance, through stable boards with female representation and outside directors, can balance the risk of cartel formation.

Yet, cartel remains complex and dynamic objects. There may be an apparent explication of why CEOs and boards might choose to form a cartel, but price dynamics alone are not altogether sufficient to explain any given cartel in its specific political and social context, as well as in economic context. The weight of research so far has more or less emphasised how cartels fail, rather than why they arise (except as price mechanism for market power by oligopolistic forces). This research has instead contributed to an effort to describe both qualitatively and quantitatively some of the factors that might precipitate cartel formation, by researching the data and developing a model of matched cartel and non-cartel firms, and then comparing cartel and non-

cartel attributes as to CEO and corporate governance characteristics. As Fear (2007) comments, the "*internal organisational dynamics of cartels needs more research, embedding it in economic, organisational, and political theory".*

Internal controls comprise a great many delegated and now often automated functions of corporate governance. Sarbanes-Oxley changed the landscape of corporate governance by nominating corporate boards as responsible for highly detailed auditing and internal control processes that must be monitored and assured by the board. Risk management, which used perhaps to be an arcane mandate of mathematical and economic exactitude, now assumes a far more system-wide and holistic role, including overall IT and information resources. If boards make decisions on internal control and auditing, and this responsibility assumes a greater profile today, as in SOX – how this responsibility could be denominated in respect of internal controls over cartel formation - remains a subject for more research.

The fundamental question has been who will police the policy in respect of the corporate board and CEOs of major corporations? There are two paths to supervision. The internal supervisory is a function of the board, which is supposed to fulfil the remit of policing. The second is of course external supervision and engagement with public regulators (which also leaves open the question of who can regulate public entities with equal integrity).

The answer in the past would have been to rely on the integrity of the board, in a passive manner, and especially a manner that rested on the social and intellectual distinction of the board and its inferred status, as well as the board's presumed integrity. There are two problems with this perspective. Recent history has shown that boards are either corruptible (the old boys' network adage), or not engaged enough. The frequency of board meetings in some firms can even be very low. It will be regulators, partly as third parties overseeing contracts that will have to bear the extra burdens of time and other resources.

Therefore, it is appreciated how the US DoJ has set a highly sophisticated example of how to disrupt cartel activity using its *carrot-and-stick* techniques. In tandem with individual sanctions, amnesty programmes have been developed for individual executives, often to find if multiple cartel arrangements are in progress. When a firm fixes prices in one market, cartel arrangements in other markets may well be likely, in the experience of DoJ investigators (LeClair, 2011). The latest version of DoJ amnesty dispensation, Amnesty Plus, invites executives to disclose all past and current involvement in collusive agreements, but with increased individual penalties for

obstructing justice in a cartel case. The DoJ has embarked on extensive publicity exercises to broadcast as widely as possible the new risks attached to remaining silent in a cartel case. The whole culture of cartel disruption by investigatory bodies, if the US lead is taken (and the OECD is a strong supporter of such a lead) will be to exercise increased pressure on individuals at all levels, but especially at board and C-suite level. Executive obstruction of justice will be treated by DoJ investigations as aggravated offences if discovered (LeClair, 2011). Sentences in the US are of increasing severity, so much so that the average sentence for antitrust offences between 2000–2005 was double that of the 1990s (Cseres, Schinkel, and Vogelaar, 2006). Directors have been known to lie to firm lawyers for many years as to meetings with competitors (Jephcott and Lübbig, 2003). This kind of behaviour should become unacceptable.

Studies have now investigated the career path of individual managers who have been involved in cartel activity. Rosenboom's (2012) research for instance focussed on Holland, where the usual EC penalties (10 percent of overall global revenue) and personal fines up to € 450,000 are turned into public information. The effect is to exert reputational damage and a strong negative effect in career progression. The study uses binary and multinomial logit modelling techniques similar to those used in this study. Rosenboom showed that reputational damage is in fact linked to subsequent career damage, and that by extension, more grievous reputational damage will have a greater deterrent effect on individual managers who may be tempted to engage in cartel activity. Since cartel activity is increasingly a strategic management choice in a globalised environment, where the temptations may be considerable and the cloaking and difficulty of investigation effects of international collusion may be great, Rosenboom's findings are also significant for CEO and management deterrent.

Increasing the individual punishment factor to include jail sentence would be expected to have a large effect. Since this study has found that individual CEO characteristics have a large effect on the likelihood of cartel formation, responding with individual sanctions that deliberately undermine the reputation of individuals, meaning jail sentences *even of minimal length,* could have significant deterrent effects. Further research is called for to help quantify and qualify just how jail sentences have career effects, but of course, research in the US where sentencing is more routine, does show that recidivism is a very rare event. Europe thus has much to learn in developing a comparable punishment regime to match that of American experience (as well as learning from the leniency programmes which also can affect individual behaviour).

Corporate governance is an effective tool for maintaining performance and safeguarding the corporate financial security of firms, and this is especially critical in emerging and privatising economies. These kinds of economies (including those in China) are generally exposed to higher external risks, operational transitions, and diversification (Dharwardkar, George, and Brandes, 2000). The proper scope of corporate governance in agency theory is limited to the relationship between managers and owners of the firm. Agency costs include those involved in shareholders monitoring the performance of managers. Yet, designing a contract to eliminate all possible sources of agency risk is impossible (Jensen and Murphy, 2004). There will always be agency risks involved in the limited firm form of organisation. Agency theory requires good corporate governance tools, techniques, policies and procedures to minimise agency costs. This study, by providing a new empirical tool, could contribute to monitoring the risks of collusion, especially in developing countries, and help investors or other firms with decisions around investment, whether capital or foreign direct investment.

Firms will also do well to examine the risk of inadvertent cartel activity. A leading UK antitrust lawyer, Luke Tolaini, advised that the new UK measures mean employees might go to jail for inadvertent behaviour. Deliberate price fixing may offer a clear example, but more subtle and less blatant cases might arise, and hence *"employees at risk really need to be trained in what they can and can't do when it comes to communications with competitors"* (Chadderton, 2012). Training around cartel provision will need to be increased amongst firms. Boards should also be aware that sudden price changes and employee familiarity with competitors' strategies, or meetings with competitors, need to be investigated (OFT, 2010). It is also worth noting that compliance programme may well act as an aggravating factor in the imposition of any fine (Jephcott and Lübbig, 2003).

Moreover, a firm facing cartel-related exposure must navigate a path laden with pitfalls: varying obligations and exposure across jurisdictions; risk of cross-jurisdictional disclosure even without a waiver; and the fact that amnesty or leniency in one jurisdiction does not ensure amnesty or leniency in another. Firms must carefully evaluate the conflicting incentives and complications around cartels, and develop a sophisticated *global* approach to mitigate cartel-related exposure with a comprehensive compliance programme (Fishbein, Kafele and O'Neill, 2012). Given that fines are likely to rise, as evidence mounts that the deterrent effect is wholly sub-optimal, the implementation and adaptation of a compliance code will only become more pressing (Lande and Connor, 2011).

6.3 Corporate Anti-Cartel Compliance Programme

There are five basic elements that have been identified as pivotal to a comprehensive compliance code program (Furse and Nash, 2004):

i. **Audit function** – This is a broad based assessment of what firm activities might actually be subject to competition law. As such, the audit is a risk identification procedure. The audit is to be conducted by either firm or external lawyers with advanced knowledge and experience of competition law. An audit can identify prospective problems that could potentially be of significance in relation to competition law. The audit should cover both the civil/ administrative and criminal law elements of the appropriate legislation. Separating out civil from criminal codes and sanctions is not advised, and sends the wrong signal that there are lesser penalties for some forms of cartel activity. Familiarity with the firm, the market, and market dynamics would be essential to establish a baseline standard of transparency that should grow in time. Questionnaires directed to senior management and board personnel, as well as the CEO, shall seek out relevant financial and corporate information, plus the internal perceptions of firm activity. An acfirming document should provide a description of competition law and typical cartel terminology, including typical cover phrases that disguise cartel operations. As a distinct form of audit practice, there should be special focus on the sales and marketing departments, since these employees have the greatest volume of communication exchanges with other firms and competitors. Private contracts over intermediate products (such as the lysine cartel) present especially higher (structural) risks of cartel formation. Past problems and personnel likely to be involved should be focus points. Areas of high, medium, and low risk activity can be identified and placed in a special risk register, using *"examples of activities that raise competition law risk" (*OFT, 2010).

ii. **Risk assessment** – The risk assessment draws on the audit to measure and balance out the potential consequences of those activities affected by competition and cartel offences in the civil and criminal spheres. Jurisdictional differences such as the *de minimis* condition of EU legislation (not applicable in the US) should be made clear. A cost benefit analysis in the EU might persuade a firm that a risk is acceptable since the threat of detection and penalties may be lesser than abandoning a specific activity. However, criminal sanction will have to be assessed on different as well as more

intangible merits. The reputational costs to senior management and the firm, and incarceration for senior management, may be too imperative in certain jurisdictions to allow any, even minor dispensation, towards cartel activity. Either the activity triggering cartel offence sanctions is terminated or notification given to the relevant authority of the arrangement with an application for exemption from e.g. EU Article 81. The risks associated with continuation of the activity, and concealment, including the destruction of evidence, should be made clear, including terms of imprisonment and personal fines.

iii. **Modifications** in organisational behaviour and responses to competition law using the findings of the audit and risk assessment. The design and implementation of any compliance programme depends heavily on proper sponsorship by C-suite executives and senior management through mission statements including norms and values expected of the organisational culture of the firm. A code of ethics can be used to achieve a similar effect of high expectations in regard of organisational behaviour. The expectations must be placed upon all relevant employees and directors. The expectations of full compliance with the law might also be contained in written undertakings in employment contracts which allow for disciplinary proceedings should an employee be found to have engaged in cartel activity. Specific conduct modifications after the fact of the initial setting of policy must also be formalised and written down in redesigned policies. The board and ethics committee should maintain sufficient autonomy from the CEO and senior management in respect of independently monitoring code compliance, and be offered sufficient resources and authority to implement that monitoring role with exactitude and authority.

iv. **Training.** Once suitable policies are in place, training must be at the heart of the risk mitigation process. The risk assessment of the firm's activities must be fully understood by all employees, and that either intentional or negligent breaches of cartel law can command an assortment of disciplinary, civil and potentially criminal sanctions. Training, as well as notifying employees of the adverse effects of cartel infringements, should also stress building employee confidence over 'the rules of the game,' and stimulate an ethical business culture with reputational advantages to the firm. The same training can include and augment many other forms of compliance, over anti-bribery, corruption, internal fraud, or health and safety and environmental issues. All new employees should be trained in the code. More generally, the details

of the law itself should be available for further inspection. The firm's attitude should be proactive and reinforced by follow-on training sessions for all staff. The firm shall take account all relevant legal and market developments as well as evolving global and industry standards to update and adopt the compliance code as necessary to ensure its continued effectiveness. In particular, all members of the board should be completely familiar with current requirements for code compliance. Periodic testing of employees' knowledge of competition law should be undertaken. In particular, testing can focus on the particular risks on non-compliance with certain firms in certain market positions. For instance, the risks of cartel involvement are different for small player in very large markets compared to dominant firms (OFT, 2010). Joint ventures and co-operative arrangements may need special diligence and training. Training by 'box-ticking' for all employees without distinction of roles and risk exposure, or a 'one size fits all' approach to compliance can in fact be counterproductive (OFT, 2010: 28). Complex matters of competition law, including intellectual property and patent abuse, should be covered as appropriate.

v. **Cultural change** if necessary, along with proper evaluation of current behaviour and the identification of improvements and gaps, with an action plan to remedy current or potential shortcomings. The issue of cartel code compliance should be a regular point of discussion at board and senior management meetings. An ethics committee may encourage and support anti-cartel policies at every level of firm activity, including subsidiaries. Compliance and reporting potential violations of compliance should become the duty of employees at every level of the firm. Confidential reporting channels and amnesty programmes should be developed. The OFT recommends appointing a 'compliance champion' so that responsibility and accountability is further personalised and has a focus point in the organisation, at the same time as code compliance develops as a general norm (OFT, 2010: 18). Violations of competition law at any level should be immediately reported to the authorities. The allowable scope of communications and relations with competitors, and within trade associations, should be understood. Communication records should be treated on a potential evidentiary basis, and procedures for handling 'smoking guns' must be formalised. Ultimately, management by exception (C-suite takes over from senior management only in more egregious examples) of non-compliance is no longer an acceptable practice.

6.4 Chapter Summary

This chapter highlights the results laid down in Chapter Five to offer specific answers to the research questions. A cartel is a response of the firm to the increasingly competitive and challenging environment. This study tackles how human and organisational factors can potentially exacerbate or reduce the formation of cartel. Globalisation, modernisation processes, and technological advancement increased the opportunities and potential benefits of cartel formation. The link between corporate governance and market competition demonstrates the rise of complex international competition prevailing in the current global environment, which therefore ushers the formation of cartels. Contacts amongst firms have been raised by new information technology and the rise of globalisation, which characterise the new dynamics of strategic business management in a globalised system. Optimal governance structures are likely to characterise firms surviving the competition, whilst failure and demise are the potential outcomes for those who fail to adapt their corporate governance structures to the rapidly changing business environment.

Before the upsurge of cartel scandals, firms were not assessed solely on financial performance criteria but also on analysis of boards and CEOs. The study has focused not on competition law or the nullification of market strategies, but on how organisational culture in a cartel arrangement is created and practiced by multiple firms.

The persistence of some objective quality of corporate governance is seen in the recidivism of several firms participating in multiple cartel arrangements, which is in part dependent on the market environment, as shown by the HHI index. Amongst firms with given board and CEO characteristics, a hidden tendency to cartelise competition is indicated. In order for a cartel to persist, it is important for the board, the CEO, and other organisers to bargain for its duration.

This study identifies the dependent variable as detected and non-detected cartel firms and those not in cartels at all. However, firms not committing cartels cannot be absolutely discounted of the possibility of cartel commission just because no detection had taken place, but it is also possible that they too are into cartels but have not been detected. The concept of ownership concentration amongst cartel firms is demonstrated in this report. Such ownership concentration operates in firms' collusion within the globalised environment.

In terms of cartels and compliance code needs, there exists corporate anti-cartel compliance programme, which includes audit function, risk assessment, training, organisational behaviour modifications and responses to competition law, as well as cultural change and proper evaluation of current behaviour.

The next chapter provides a summary of research results, recommendations, limitations of the research, suggestions for future research, and conclusion, finalising the findings and insights for this study.

Chapter Seven

Summary and Conclusion

7.1 Introduction

This chapter summarises this research study and its key findings. It will be structured as below:

1. Summary of the research results
2. Research recommendations
3. Limitations of the research
4. Suggestions for future research
5. Conclusion

7.2 Summary of Research Results

Fifteen propositions and main findings of their tests are summarised in Table 7.1. The results generally suggest that there is a relationship between corporate governance attributes and cartel formation.

Table 7.1 Summary of Research Results

	Proposition	Findings	Models
Board Characteristics			
P1:	The size of board of directors is larger for firms committing cartel than for a matched sample of non-cartel firms.	Supported and significant at p<0.05	1,7
P2:	The percentage of independent (non-executive) members on the board of director is lower for firms committed cartel crime than for non-cartel firms.	Supported and significant at p<0.05	1,7
P3:	The average age of board directors for cartel firms is lower than non-cartel firms.	Not supported	
P4:	There are less female directors on the board of cartel firms than the non-cartel firms.	Not supported	
P5:	The average duration of the cartel board is less than the non-cartel firms	Not supported	
P6:	Board remuneration for cartel firms is higher than non-cartel firms.	Supported and significant at p<0.05	1,7
Ownership Structure			
P7:	The percentage of outside directors' stock ownership is lower for cartel firms than for a matched sample of firms not convicted of the cartel	Not supported	
P8:	Cartel likely to be formed by family-owned and controlled firms	Not supported	
CEO Characteristics			
P9:	The age of the CEO for cartel firms is higher than non-cartel firms	Supported and significant at p<0.05	3,4,5,6,7
P10:	The number of years a CEO had served as a director for a cartel firm is less than that for non-cartel firms.	Supported and significant at p<0.05	3,4,8,9,10
P11:	Female CEOs are less represented in cartel firms than in non-cartel firms.	Supported and significant at p<0.05	4,5,6
P12:	Boards of directors of a firm committing cartel crime are less likely to have directors who work on other boards, compared with boards of directors of non-cartel firms.	Not supported	
P13:	Firms that commit cartel crimes are more likely to have CEOs serving as board chairs compared to non-cartel firms.	Supported and significant at p<0.05	2,3,4,5,6,7
CEO Compensation Scheme			
P14:	The average CEO bonus for cartel firms is higher than non-cartel firms	Supported and significant at p<0.05	8
P15:	The average CEO share for cartel firms is higher than non-cartel firms	Not supported	
P16:	Total CEO Compensation for cartel firms is higher than non-cartel firms.	Supported and significant at p<0.05	10

In addition the study also found that The **CEO** tenure in models 7, 8, and 9 is negative and significantly different from zero in estimating cartel formation and discovery **(CONV). BOSS** (Model 9) and **SHARE** in cartel firms are lower than non-cartel firms and have no significant effect.

Moreover, Board size (**Sizeba**), board duration (**DURBA**) and non-executive directors (**NED(**%)) have a significant difference between UK cartel firm-home and UK cartel firm-abroad in terms of board characteristics. Board age (**AGEB**A), gender of the board (**GENBA** (%)) and outside ownership (**OUTOWN (%))** have no significant difference based on p-value of 0.05.

CEO Characteristics, CEO tenure (**CEOten**) and CEO age (**CEOage)** demonstrate a significant difference along with CEO compensation. The size of the board (**SIZEBA**) and board duration (**DURBA**) indicate a significant difference at $p<0.05$, along with the age of the board at $p<0.01$.

7.3 Research Recommendations

Recommendation 1: All firms should maintain a compliance code in respect of anti-cartel expectations.

Internal management controls must both incentivise and constrain managers to remain within the limits set in firm law, but if these controls are not in place, identifying accountability becomes far more difficult. Accountability is obfuscated by having poor internal controls, and these controls may be left deliberately diffuse at senior levels of management. Other "professional hiding techniques" and "indemnification methods" would include finding low-level scapegoats, and contractual insurance as a bonus or benefit that contains a clause to leave the firm with immediate effect if antitrust proceedings could have any ultimate personal consequences (Cseres *et al.*, 2006). These types of omissions and escapes must be avoided, and a compliance code will go some way to eradicating lapses and corrupt practices such as these types of arrangements.

In the Hampton Review in the UK, it was found out that too many forms and duplication of regulatory activities placed a significant burden not only on the regulated third party, but also on the regulator, and degraded the efficiency of regulation. The development of a risk register on potential cartel activity could alleviate some of these burdens on regulators, who often, are woefully under-resourced, especially in regard to investigating complex and international arrangements of hidden collusions.

Recommendation 2: Data related to potential cartel arrangements should be proffered by firms and made obligatory by regulators in order to alleviate the burdens of sector inspections in competition reviews.

Firms that have no history of cartel activity and which have developed anti-cartel compliance codes would obviously benefit from lighter touch inspections. *The carrot and stick* approach should also include how data is collected. The research conducted in this study encountered a range of difficulties assembling a comprehensive set of data on cartel activity alongside CEO and board characteristics. Any accurate risk assessment process automatically requires comprehensive and current data to be effective. Knowing that regulatory data now include CEO and board characteristics would place more effective supervisory pressures on CEOs and boards to not engage with cartel activity. Accountability will be enhanced by improved and comprehensive data collection.

Studies have detected tacit or secret collusion using econometric techniques that only require average price data and a minimal amount of other data (Ganslandt, *et al*., 2007).This study performs a similar function in respect of organisational data, but the assembly of such data remains a substantial opportunity cost for researchers. Hence one of the recommendations of the study will be not only around co-operation of leniency or sanctions, or other matters of disciplinary policy, but also around information, and the kinds of information strategies that national and international authorities will require to publish as regular schedules, if anything like real time risk assessment, or detection of collusion is to become more likely.

Recommendation 3: Cartel should be distinguished between hard-core and crisis cartel. Leniency programmes should reflect the distinction. A categorisation procedure for labelling cartel as ‘hard-core’ should be followed and extra remedies applied in the aftermath in terms of transparency, this would include board and CEO characteristics. A board that has previous cartel experience and goes on to commit further recidivist acts of cartel activity should be punished with extra and punitive sanctions.

Recommendation 4: Sanctions should be capable of deterring firms, including board members and CEOs, from cartel participation; lifetime bans on board participation or CEO responsibilities should be considered for the most egregious hard-core cartel arrangements.

The cartel offence in the UK set out within Part VI of the *Enterprise Act* of 2002 remains the single piece of UK competition law to be criminal in nature, with breaches facing prison terms of up to five years (and unlimited fines). The act is stand-alone, and not connected to other competition laws, and is directed at individuals, not corporate entities. The same board directors

in breach of the Act may also be disqualified, and it is this latter punishment that is reckoned to have the maximum impact on rates of compliance. The cartel offence is sufficient grounds alone for disqualification, although this is a recent phenomenon (Furse, 2004). The director of a firm found to have breached the law may also be found "*unfit to be concerned in the management of a firm"* (Furse, 2004). This is upheld even if only the omission of action against the breach is found, where reasonable grounds would have suspected the matter of the breach, or the director had direct responsibility and should have known the breach. Competition disqualification orders or undertakings (CDO / CDU) can follow, with the disqualification period potentially reaching 15 years. There is a great deal of discretion in such arrangements, perhaps too much for the maximal deterrent effect on individual CEOs and board members.

To separate hard-core from other forms of cartel, and especially the so-called 'crisis cartel' is one recommended distinction of contemporary thinking on the subject of cartel. Cartel do not always have a uniformly destructive intent or purpose. In economic crises, the national and international competition authorities maintains an advocacy role for enhancing competition but when price and market volatility, (and the consequences of that volatility), become severe (especially for poorer producers), then 'crisis cartel' may be accepted as a viable practical alternative that may have some merit as a temporary remedy to market volatility. Other intervention measures should be considered, amongst them financial market and credit alternatives (OECD, 2004). However, the results of this study show that a focus, like U.S. DoJ practice, should be maintained on individual CEO and board responsibility.

The outcome or 'Response' by the UK Government's Department for Business, Innovation and Skills (BIS) to its own competition review created much controversy with lowering the criminal standard for the UK cartel offence. Critics have recently berated the dangers of lowering the standard since expanding the scope of criminal behaviour is dangerous, merely to expedite prosecutions. Patel and Gottlieb (2012) point to the injustice of prosecuting "*mid-level executives who may not be privy to the full commercial impact of their actions*". Therefore, the legal fraternity and government are expanding the organisational scope of cartel offences to sub-CEO and sub-board levels of management. This in fact should be encouraged.

The OECD's (2002) new lead on this change – "*individual sanctions can strengthen the incentive of directors and employees to resist corporate pressure to engage in unlawful activity, and thus enhance the level of deterrence"*– is partly spurred by how individuals in the US went to great lengths, and offered to pay punitive levels of fines, to avoid prison.

Recommendation 5: Co-operation and policy formation amongst countries should be considerably expanded so as to facilitate the detection of international cartel activities.

By necessity, with the GATT and WTO reduction and dismantling of tariff barriers, competition is seen by CEOs and directors through a thorough "international lens" (LeClair, 2011). This internationalisation process has indeed changed the way cartels co-operate and how competition laws must be regulated and enforced. First, regulation and investigation will often involve domestic and foreign firms. Disclosing and sharing confidential commercial information, as part of a prosecution, must be done with utmost care, in consideration of foreign legislation negotiated in parallel between foreign regulators (LeClair, 2011). This may lead to inefficiencies as well as unfamiliar complexity. Different sanctions in different jurisdictions also raise questions of justice. The OECD has strongly supported harmonisation of domestic privacy laws in connection with antitrust investigations (LeClair, 2011: 107).

Recommendation 6: The group total turnover rule should be applied with greater consistency and frequency.

Attributing liability to a parent firm has potentially significant consequences for all firms with economic activity in the EU (Atlee, Botteman and Joshua, 2012):

i. The maximum fine limit of 10% of global turnover now applies to aggregate group sales on a global basis as a single economic unit, which means subsidiaries can be jointly and severally liable for fines, which would finally become times the limit that would have applied to them as separate economic units.
ii. The risk of discovering recidivism, i.e. **CONV**>1 - which can attract more punitive levels of fines – will now automatically increase if *any* previous cartel activity amongst subsidiaries could potentially be taken into account (Atlee *et al.,* 2012).

The expectation is that deterrence effects will be raised. The deterrence signal and threat of sanctions applied to large firms and especially multinationals will be watched and incorporated into an organisational culture when in fact "total group turnover is taken as the yardstick" (Atlee *et al.,* 2012). The actions of subsidiaries would be accountable, and then court decisions taken against parent firms could make filing civil damages more plausible and financially viable. In such a regulatory and legal environment, the imperative to recreate an anti-cartel culture across a whole organisation, with all that implies for C-suite sponsorship, resource commitment and new

norms and values, will be much more easily promulgated. This approach to deterrence and prosecution has been lacking in the UK.

Recommendation 7: As the UK authorities acknowledge, there should be greater sharing of expertise or secondments in order to improve case management", precisely in order to bring a proactive competition perspective to sectoral regulation, instead of only more passive administrative regulation (such as monitoring mergers and acquisitions, and concentration indices, as the main pro-competition features of any sector) (Business Innovation and Skills, 2012). The expansion of these exchanges on an international front should be sponsored by governments, but there is much to be done at national levels.

Recommendation 8: Sspecialist risk assessment tools should be used and shared between countries in order to make regulation and investigation more efficient and less costly to firms and regulators. Bilateral and multilateral consultations over risk assessment procedures should be formalised and established on a regular cycle.

For instance, in this study, a risk assessment procedure could have been developed from grouping CEO and board characteristic risk factors, and plotting the two aggregates on a graph with a 2x2 matrix overlay. An example template is given in Appendix 9.

Recommendation 9: Records of cartel activity and sanctions against any single firm should be placed in the international domain, in a specialist register for access by sanctioned public bodies and researchers.

The difficulty in espousing transparency in corporate governance, partly for mitigating the agency problem by information symmetries between principals and agents, is that the business and managerial world is tirelessly inventive and improvisational. In oligopolistic markets, some incentives induce income smoothing that allows shareholders to enjoy high collusive profits, and the low-powered managerial incentives are "optimal" in how they induce behaviour that ultimately maximises firm profits. Increased transparency through Corporate Governance "codes of best practice" may then have negative consequences, if those measures reinforce the pro-collusive effect of increasing the cost – or prevent entirely – a secret renegotiation of top managers' compensation. Like all monitoring regimes, with too great an intensity of surveillance, all kinds of behaviour are driven 'underground', and these can even exacerbate milder forms of corporate abuse, including less hard-core cartel formation. Therefore, one of the

messages of the empirical research could be that only very high risks of the more egregious collusive behaviour should be recorded and policed, at least to begin with.

Recommendation 10: More specialist risk assessment research should be funded into the organisational cultures and structures that facilitate cartel formation. Recognition should be made that the regulative, normative and cognitive-cultural aspects of cartel activity must be investigated along with traditional economic activities.

Recommendation 11: In relation to Recommendation 10, cartel culture can be reproduced, like any other form of corporate culture, by hiring practices. The power of **CEOCASE** and **CEONUM** to basically predict recidivist behaviour is striking. There should be research in human resource management studies as to how those CEOs and board members who have participated and facilitated cartel activity, were actually recruited. How corporate action is embedded within social networks assumed almost the status of conventional wisdom in organisation theory throughout the 1980s, with the rise of 'economic sociology' that criticised the 'under socialised' quality of economics in general (Granovetter, 1985). Inter-corporation links between directors have since then attracted a significant amount of attention (Davis and Robbins, 2004). Examining such links around cartels from a human resource management perspective may be instructive. Remuneration and rewards have been studied in depth in the research, and this research has also included remuneration (**REMUN**) as a factor in cartel formation. Empirically speaking, the size of remuneration effects (around -0.03) was much lower than many of the other effects such as **gender**. The investigation of cartels could and should also be extended further back in time to the recruitment processes of cartel firms, and whether or not boards and **CEO positions** are publicly advertised, or whether the positions are filled with private sponsorship of known individuals. The successes of "*carrot-and-stick*" policies – invoking harsher penalties for cartel ringleaders and instigators, but improving programmes designed to reward defecting cartel members who then co-operate with competition authorities, should be extended. Data collection should follow through on how changes in CEO and board personnel follow from both carrot-and-stick approaches.

7.4 Limitations of the Research

Corporate governance is certainly rising in interest with "truly interdisciplinary" research undertaken by researchers not only in the fields of economics and finance, but also in law, management, and accounting (Bebchuk and Weisbach, 2010). The relationship between corporate governance practice and cartel, in a time of rising cartel activity, deserves more research, which must be of an interdisciplinary kind.

In this study, the internal control environment is focussed on board characteristics and not on board decisions or activities. The model is a static model of board and CEO characteristics. Empirical studies, such as this one, are insufficient to extract the dynamic measures of personal force that all cartel, and especially sophisticated cartel, must muster in their lead organisers. Chen (2008) revealed how a CEO's delegation of authority over collusion, and the decision-making in connivance of collusion, can actually mitigate the temptation of a subordinate to renege or whistle blow on the cartel. Thus, CEOs and board members may use their personal influence, and charisma, to trap others in a cartel and its maintenance, by effectively 'framing' the subordinate as an active participant in the cartel. This is added to the research indicating that minimising the maximum temptation to renege on assumed active participation, or a relational contract, is the best strategy for cartel longevity (Baker, Gibbons and Murphy, 2002). The CEO's personal charisma and influence is critical in these matters, and of course will remain an elusive characteristic to model.

Also, in hierarchical but decentralised firms, the exposure of top executives, such as CEOs and board members, is often minimal compared to that of senior managers (Chen, 2008). However, there is little data as yet on individuals in cracked cartel. This study is one effort to supplant that lack. One study found only two firms from nine where top executives had decision-making roles in collusion, within a study of decentralised firms (Harrington, 2006a). Therefore, the data here could be further checked whether or not this feature of collusion exists in the data set.

In common with most empirical studies, this research considers known cartels as well as those not detected but might also be involved in cartelisation. The dependent variable (**CONV**) which separates those firms that formed cartels that were detected from all other firms some of which were not in cartels and other which were in cartel but were not detected/ discovered. The non-cartel firms however, might also be in cartel but have not been discovered/ detected, which cannot qualify them to be called "*cartel firms*" in this study. Therefore, there is a possibility that

some of the non-cartel firms in this study are already in undetected/ undiscovered cartel. Most cartels then are clandestine in their co-ordination and organisation of cartel activities, as would be expected. Cartel members typically attempt to cover up or destroy evidence of their meetings and communications. Suggestions in the cartel literature are that only about 10% to 30% of all such conspiracies are discovered and punished (Connor, 2008).

Undiscovered cartels may be more durable or may differ in some other economic characteristics, but it is also possible that discovery is tied only to managerial personality characteristics (e.g., the tendency to become a whistle-blower), which are distributed disproportionately to discovered cartels. If the latter is true, then the discovered cartels in this report may be representative of the majority of cartels that are hidden. However, much more research will be needed into how cartel duration is helped by CEO and board characteristics. The bargaining power of CEOs and boards to effect a working cartel arrangement would need studies in greater depth, but of course this will be a difficult study to engage with for any CEO or board member who wishes to continue with a corporate career.

Firms right now resort to codes to dissemble over firm names, plus encryption software, anonymous mailboxes including email, and select use of memory sticks instead of desktops, and encrypted mobile communications, all to secure secret co-ordination of the cartel (Whish, 2009). This research has contributed to the organisational dynamics of firms, but some of these technical issues need more research as part of organisational culture that rely on technology for illicit activity.

The study is also dominated by UK firms. There can be little doubt that the profile of CEO and board characteristics as well as ownership structure would shift for a study dominated by Chinese firms for example, where it is well known collusion and secret networks of influence have led to expropriation and price fixing schemes. The field of research remains to be opened onto the Asian experience of cartel operation, and with the rise of the BRIC economies (Brazil, Russia, India and China); this research could have some influence on policy directions for a global economy.

7.5 Suggestions for Future Research

Even though the results of this research provide evidence that a number of corporate governance attributes are significantly related to cartel formation, there are several areas that are not covered, although that might be relevant to corporate governance and the formation of cartel.

One of the possible avenues for future study is testing other corporate governance attributes that might aid the cartel formation, such as the audit committee and institutional investor.

An additional avenue for future research is to test the period post cartel (after) conviction and compare it with the period pre-cartel formation (before). In this study, the focus was only on period pre-cartel formation. However, it will be beneficial to compare the corporate structure for firms' post cartel convictions to see if there are any corporate governance changes.

Another possibility for future research is to test the corporate governance structure for multiple abusers (recidivism) and single abusers, to find out whether or not there is a visible difference between their corporate governance structures.

7.6 Conclusion

This chapter presents a summary and conclusion of this study. The results are summarised and their recommendations are discussed. The potential limitations then are presented before the avenues for future research are highlighted.

This study utilises cartel firms from an original data set of 1,901, with highest representation from UK firms, thereby supporting the decision to use UK firms as the focus of the study. There are a total number of 150 cartel firms involved, of which 114 are from the UK. The study purports to determine which characteristics of the participating firms' boards of directors are associated with cartel formation and discovery. The results confirm that there is likelihood amongst public firms to engage in cartel agreements than private firms. This study identifies the attributes of corporate governance, which are grouped in four types as the following: board of directors' characteristics, ownership structure, CEO characteristics, and CEO compensation package.

The challenge of this study is that the personal attributes of CEOs and boards can make a significant contribution to the risk profile of a cartel being formed. This indeed would be to 'diagnose' organisational culture in a quite radical direction. The study suggests and finds that some corporate governance attributes are associated with cartel formation. The results reveal consistency with prior researches, that cartel firms have different corporate governance relative to a control sample in the three years prior to cartel formation. Specifically, the study concludes that cartel firms characterised by having larger board size compared to non-cartel firms; lower percentage of independent member (non-executive); higher average of board remuneration; less likely that cartel firm is owned and controlled by family; older CEOs represented on the board; having CEO who served a less number of years as a director; less likely to have a female CEO represented; more likely to have CEOs who's combined CEO-chairman position; and a higher average of CEOs bonuses and compensation packages.

The main contribution of this research is to fill-in the existing gap in the literature on the relationship between corporate governance attributes and cartel formation. This study provides a contribution to understand how, and in what comparative measure, board characteristics, CEO characteristics and ownership structure do contribute to cartel formation likelihood. By providing an empirical instrument, this study may also contribute to monitoring the risks of collusion. The findings also consider the requirements for disclosure of corporate governance practices.

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APPENDIX

Appendix 1: Final Cartel Sample:

Case	Comp	Nation	Start	End	Conv	DOJ	EC	CC	Others
Copper plumbing fittings	Aalberts	NL	1998	2001	1	0	0	1	0
Steel, Flat Stainless	Acerinox SA	ES	1993	1996	1	0	1	0	0
Copper plumbing fittings	Advanced fluid Connections	US	1998	2001	1	0	0	1	0
Gasoline, Retail, Czech Republic	AGIP	US	2000	2001	1	0	1	0	0
Airlines, cargo, fuel surcharge	AIR ATLAS LIMITED	UK	2000	2005	1	0	1	0	0
Airlines, cargo, fuel surcharge	Air Canada	CA	2000	2005	1	0	1	0	0
Airlines, cargo, fuel surcharge	Air France-KLM	FR	2000	2005	22	0	1	0	0
Airlines, passenger, fuel surcharge	Air France-KLM	FR	2004	2007	2	0	1	0	0
Compressed industrial and medical gases in NL	Air Liquide	FR	1993	1997	1	0	1	0	0
Gases, medical oxygen, AR	Air Liquide	FR	1997	2004	2	0	0	0	1
Gases, medical oxygen, one rigged bid, CL	Air Liquide	FR	2004	2007	3	1	1	0	0
Compressed industrial & medical gases in NL	Air Products	UK	1993	1997	1	0	1	0	0
Airlines, passenger, fuel surcharge	Air Canada	CA	2004	2007	2	0	1	0	0
Pharmaceuticals, generic, Brazil	Akzo Nobel NV	NL	2001	2005	13	0	0	0	1
Supermarkets	Aldi	DE	2000	2005	1	0	0	1	0
Thread, automotive, EU	AMANN UK LIMITED	UK	1990	1996	1	0	0	1	0
Construction, air conditioning systems, AU	AMEC P L C	UK	1991	2004	1	1	1	0	0
Music downloading services, US	APPLE OPERATIONS INTERNATIONAL	US	2004	2008	1	1	0	0	0
Toys & Games. UK	ARGOS LIMITED	UK	1999	2001	1	0	0	1	0
Dairy products (milk, butter, UK cheese),	ARLA FOODS LIMITED	UK	2002	2003	1	0	0	1	0
Supermarkets	ASDA STORES LIMITED	UK	2000	2005	1	0	0	1	0

Case	Comp	Nation	Start	End	Conv	DOJ	EC	CC	Others
Insurance premiums, non-life, Italy	ASSICURAZIONI GENERALI-SOCIETA PER AZIONI	IT	1993	1996	1	0	1	0	0
Antiseptics & disinfectants, IT	AstraZeneca PLC	UK	1995	2004	1	0	1	0	0
Pharmaceuticals, generic, Brazil	AstraZeneca PLC	UK	2001	2005	2	0	0	0	1
New cars	BMW (UK) LIMITED	UK	2000	2005	1	0	0	1	0
Distribution, pharmaceuticals, CZ	BOOTS (ALLIANCE BOOTS HOLDINGS LTD)	UK	2006	2006	1	0	1	0	0
Gasoline, Retail, Motorway Stations, France	BP (UK)	UK	1999	2002	1	0	1	0	0
Gasoline, Retail, Spain	BP (UK)	UK	1998	2001	2	0	1	0	0
Plasterboard	BPB LIMITED	UK	1992	1998	1	0	0	1	0
Radiological Contrast Media, Non-Ionic, IT	BRACCO UK LIMITED	UK	1995	1999	1	0	1	0	0
Marine hose (bid rigging vs. petrol. Cos)	BRIDGESTONE COP	UK	1999	2007	1	1	0	0	0
Pharmaceuticals, generic, Brazil	BRISTOL - MYERS SQUIBB PHARMACEUTICALS	UK	2001	2005	1	0	0	0	1
Zinc phosphate	BRITANNIA ALLOYS & CHEMICALS LIMITED	UK	1994	1998	1	0	0	1	0
Airlines, cargo, fuel surcharge	BRITISH AIRWAYS PLC	UK	2000	2005	1	0	1	0	0
Airlines, passenger, fuel surcharge	BRITISH AIRWAYS PLC	UK	2004	2007	2	0	1	0	0
Carbonated Drinks	BRITVIC HOLDINGS LIMITED	UK	1991	1998	1	1	0	0	0
Supermarkets	BUDGENS STORES LIMITED	UK	2000	2005	1	0	0	1	0
Carbonated Drinks	CADBURY SCHWEPPES P.L.C.	UK	1991	1998	3	1	0	0	0
Airlines, cargo, fuel surcharge	CATHAY PACIFIC AIRWAYS LIMITED	UK	2000	2005	1	0	1	0	0
Airlines, passenger, fuel surcharge	CATHAY PACIFIC AIRWAYS LIMITED	SG	2004	2007	2	0	1	0	0
Oxo-Alcohols	CELANESE CHEMICALS UK LIMITED	UK	2003	2007	1	0	1	0	0
New cars	CITROEN U.K. LIMITED	UK	2000	2005	1	0	0	1	0
Construction, air conditioning systems AU	CMS ENERGY UK LTD	UK	1991	2004	1	1	1	0	0
Carbonated Drinks	Coca-Cola & Schweppes	UK	1991	1998	1	1	0	0	0
Gasoline, Retail, Czech Republic	CONOCOPHILLIPS PETROLEUM FIRM U.K.	UK	2000	2001	1	0	1	0	0

Case	Comp	Nation	Start	End	Conv	DOJ	EC	CC	Others
New cars	DAIMLER UK PUBLIC LIMITED FIRM	UK	2000	2005	1	0	0	1	0
Dairy products (milk, butter, UK cheese), UK	DAIRY CREST FOODS LIMITED	UK	2002	2003	1	0	0	1	0
Auditing Services, IT	DELOITTE MCS LIMITED	UK	1991	1998	1	0	1	0	0
Copper plumbing fittings	DELTA PUBLIC LIMITED FIRM	UK	1998	2001	1	0	0	1	0
Marine hose (bid rigging vs. petrol. cos.& Navy)	DUNLOP OIL & MARINE LIMITED	UK	1999	2007	1	1	0	0	0
Pharmaceuticals, generic, Brazil	Eli Lilly & Co.	US	2001	2005	1	0	0	0	1
Music downloading services, US	EMI GROUP (S&E) LIMITED	UK	2004	2008	2	1	0	0	0
Recorded Music, IT	EMI GROUP (S&E) LIMITED	UK	1991	1997	1	0	1	0	0
Construction, air conditioning systems, AU	ENVAR LIMITED	UK	1991	2004	1	1	1	0	0
Auditing Services, IT	ERNST & YOUNG LIMITED	US	1991	1998	1	0	1	0	0
Fuel, Aviation, IT	EXXONMOBIL CHEMICAL LIMITED	UK	1991	2000	1	0	1	0	0
Gasoline, Retail, Motorway Stations, France	EXXONMOBIL CHEMICAL LIMITED	UK	1999	2002	2	0	1	0	0
New cars	FIAT GROUP AUTOMOBILES UK LTD	UK	2000	2005	2	0	0	1	0
Insurance premiums, non-life, Italy	FONDIARIA (UK) HOLDINGS LIMITED	UK	1993	1996	1	0	1	0	0
New cars	FORD MOTOR FIRM LIMITED	UK	2000	2005	2	0	0	1	0
Mobile (Cell) Phone Operators, NL	FRANCE TELECOM UK	UK	1997	2003	1	0	1	0	0
Drugs, generic (warfarin, penicillin, and anti-ulcer medicines), UK	Gold shield Group Limited	UK	1996	2000	1	0	0	1	0
Toys & Games. UK	HASBRO'S BIG PLAY LIMITED	UK	1999	2001	1	0	0	1	0
New cars	HEIDI CAR (UK) LIMITED	UK	2000	2005	1	0	0	1	0
Carbon Fiber	HERCULES GROUP PLC	UK	1992	1999	1	1	0	0	0
Carbon Fiber	HEXCEL (U.K.) LIMITED	UK	1992	1999	1	1	0	0	0
Thread, industrial in UK	HICKING PENTECOST PLC	UK	1998	2000	1	0	0	1	0
New cars	HONDA MOTOR EUROPE LIMITED	UK	2000	2005	1	0	0	1	0
IT services tenders, Episode 1, HU	IBM IRELAND INFORMATION SERVICES LIMITED	IE	2003	2003	1	0	1	0	0

Case	Comp	Nation	Start	End	Conv	DOJ	EC	CC	Others
Supermarkets	ICELAND FOODS LIMITED	UK	2000	2005	1	0	0	1	0
Copper plumbing fittings	IMI GROUP LIMITED	UK	1998	2001	2	0	0	1	0
Antiseptics & disinfectants, IT	INTERNATIONAL MEDICAL SERVICES	UK	1995	2004	1	0	1	0	0
Antiseptics & disinfectants, IT	INTERNATIONAL PA FIRM LIMITED	US	1995	2004	1	0	1	0	0
Drugs, generic (warfarin, penicillin, and anti-ulcer medicines), UK	IVAX PHARMACEUTICALS LIMITED	UK	1996	2000	1	0	0	1	0
Auditing Services, IT	KPMG AUDIT PLC	IE	1991	1998	1	0	1	0	0
Plasterboard	LAFARGE PLASTERBOARD HOLDINGS LIMITED	UK	1992	1998	1	0	0	1	0
Butyl & polybutadiene synthetic rubber, EU	LANXESS LIMITED	UK	1996	2002	1	0	1	0	0
Toys & Games. UK	LITTLEWOODS GAMING LIMITED	UK	1999	2001	1	0	0	1	0
Insurance premiums, non-life, Italy	LLOYDS TSB BANK PLC	UK	1993	1996	1	0	1	0	0
Plastic bags/sacks, industrial	LOW & BONAR PUBLIC LIMITED FIRM	UK	1991	1997	1	0	1	0	0
Antiseptics & disinfectants, IT	MEDA PHARMACEUTICALS LIMITED	UK	1995	2004	1	0	1	0	0
Copper Concentrates	MIM HOLDINGS LIMITED	AU	2003	2005	1	1	1	0	0
Mobile (Cell) Phone Operators, NL	mm02 PLC	JP	1997	2003	1	0	1	0	0
Mobile phone roaming fees, UK & DE	mm02 PLC	UK	2001	2005	2	0	1	1	0
Carbon and Graphite Electrical and Mechanical Products	MORGANITE CRUCIBLE LIMITED	FR	2002	2004	1	0	1	0	0
Dairy products (milk, butter, UK cheese), UK	MORRISON FOODS LIMITED	UK	2002	2003	1	0	0	1	0
Supermarkets	NETTO FOODSTORES LIMITED	UK	2000	2005	1	0	0	1	0
New cars	NISSAN MOTOR (GB) LIMITED	UK	2000	2005	1	0	0	1	0
Steel Tubes, Seamless ("Line Pipe" or "Oil-Country Tubular Goods")	NKK BUILDING SERVICES LIMITED	UK	1991	1995	1	1	1	0	0
Blood products, Brazil	OCTAPHARMA LIMITED	NZ	2003	2003	1	0	0	0	1
Antiseptics & disinfectants, IT	OMEGA PHARMA UK	UK	1995	2004	1	0	1	0	0
Drugs, generic (warfarin, penicillin, and anti-ulcer medicines), UK	OPD CARTONS LIMITED	UK	1996	2000	1	0	0	1	0

Case	Comp	Nation	Start	End	Conv	DOJ	EC	CC	Others
Mobile Phone roaming fees, UK	ORANGE RETAIL LIMITED	UK	2001	2005	1	0	0	1	0
Mobile phone roaming fees, UK & DE	ORANGE RETAIL LIMITED	UK	2001	2005	2	0	1	1	0
New cars	PEUGEOT MOTOR FIRM PLC	UK	2000	2005	1	0	0	1	0
Antiseptics & disinfectants, IT	PLASMASELECT UK LIMITED	UK	1995	2004	1	0	1	0	0
Auditing Services, IT	PRICEWATERHOUSECOOPERS AUDIT FIRM LIMITED	UK	1991	1998	1	0	1	0	0
Animal Waste	PROSPER DE MULDER LIMITED	UK	1990	1990	1	0	0	1	0
Sewing needles, pins, zippers, fasteners, and other hard tailoring supplies	Prym Group	DE	1994	1999	3	0	0	1	0
Snap buttons, rivets, and other non-zipper fasteners 1	Prym Group	DE	1991	2000	4	1	1	0	0
Snap buttons, rivets, and other non-zipper fasteners 2	Prym Group	DE	1998	1998	2	1	1	0	0
Zippers	Prym Group	DE	1998	1998	1	1	0	1	0
New cars	PSA Peugeot Citroen	UK	2000	2005	1	0	0	1	0
Marine hose (bid rigging vs. petrol. cos.& Navy)	PW CONSULTING (UK) LIMITED	UK	1999	2007	1	1	0	0	0
Sewing needles, pins, zippers, fasteners, and other hard tailoring supplies	QUANTUM CLOTHING GROUP LIMITED	UK	1994	1999	4	0	0	1	0
Thread, automotive, EU	QUANTUM CLOTHING GROUP LIMITED	UK	1990	1996	1	0	1	0	0
Thread, industrial in UK	QUANTUM CLOTHING GROUP LIMITED	UK	1998	2000	5	0	0	1	0
Thread, industrial, Benelux in UK & Nordic countries	QUANTUM CLOTHING GROUP LIMITED	UK	1991	2001	2	0	1	1	0
Zippers	QUANTUM CLOTHING GROUP LIMITED	UK	1998	1998	3	1	0	1	0
Drugs, generic (warfarin, penicillin, and anti-ulcer medicines), UK	RANBAXY (U.K.) LIMITED	UK	1996	2000	1	0	0	1	0
New cars	RENAULT GROUP U.K. LIMITED	UK	2000	2005	1	0	0	1	0
Copper Concentrates	RIO TINTO PLC	UK/AU	2003	2005	1	1	1	0	0
Hotels, luxury, central Paris, FR	RITZ HOTEL (LONDON) LIMITED(THE)	UK	2001	2005	1	0	1	0	0
Dairy products (milk, butter, UK cheese),	SAFEWAY FOOD STORES LIMITED	UK	2002	2003	1	0	0	1	0

Case	Comp	Nation	Start	End	Conv	DOJ	EC	CC	Others
Supermarkets	SAFEWAY FOOD STORES LIMITED	UK	2002	2005	2	0	0	1	0
Dairy products (milk, butter, UK cheese)	SAINSBURY'S SUPERMARKETS LTD	UK	2002	2003	1	0	0	1	0
Supermarkets	SAINSBURY'S SUPERMARKETS LTD	UK	2002	2005	2	0	0	1	0
Butyl & polybutadiene synthetic rubber, EU	SANOFI-AVENTIS UK HOLDINGS LIMITED	UK	1996	2002	2	0	1	0	0
Fuel, Aviation, IT	SANOFI-AVENTIS UK HOLDINGS LIMITED	UK	1991	2000	1	0	1	0	0
Gasoline, Retail, Czech Republic	SANOFI-AVENTIS UK HOLDINGS LIMITED	UK	2000	2001	4	0	1	0	0
Gasoline, Retail, Motorway Stations, France	SANOFI-AVENTIS UK HOLDINGS LIMITED	UK	1999	2002	3	0	1	0	0
Pharmaceuticals, generic, Brazil	SANOFI-AVENTIS UK HOLDINGS LIMITED	UK	2001	2005	3	0	0	0	1
Airlines, cargo, fuel surcharge	SINGAPORE AIRLINES	SG	2000	2005	1	0	1	0	0
Compressed industrial and medical gases in NL	SOL SPAS LIMITED	JP	1993	1997	1	0	1	0	0
Oxo-Alcohols	SOLVAY INTEROX	UK	2003	2007	1	0	1	0	0
Recorded Music, IT	SONY MUSIC ENTERTAINMENT UK LIMITED	UK	1991	1997	1	0	1	0	0
Bus in NE England	STAGECOACH (SOUTH) LIMITED	UK	1994	1995	1	0	0	1	0
New cars	SUZUKI GB PLC	UK	2000	2005	1	0	0	1	0
Supermarkets	TESCO HOLDINGS LIMITED	UK	2002	2005	0	0	0	1	0
Dairy products (milk, butter, UK cheese), UK	THE CHEESE FIRM LIMITED	UK	2002	2003	1	0	0	1	0
Steel, Flat Stainless	THYSSENKRUPP STAINLESS UK LIMITED	US	1993	1996	1	0	1	0	0
Music downloading services, US	TIME WARNER LIMITED	US	2004	2008	1	1	0	0	0
Recorded Music, IT	TIME WARNER LIMITED	JP	1991	1997	2	0	1	0	0
Carbon Fibber	TORAY INDUSTRIES INC.	UK	1992	1999	1	1	0	0	0
Zinc phosphate	TRIDENT ALLOYS LIMITED	UK	1994	1998	1	0	0	1	0
Plastic bags/sacks, industrial	UPM-KYMMENE (UK) HOLDINGS PLC	UK	1991	1997	1	0	1	0	0
Steel Tubes, Seamless ("Line Pipe" or "Oil-Country Tubular Goods")	VALLOUREC MANNESMANN OIL & GAS UK LTD.	UK	1991	1995	1	1	1	0	0
New cars	VAUXHALL MOTORS	UK	2000	2005	1	0	0	1	0
Mobile Phone roaming fees, UK	VIRGIN MOBILE GROUP (UK) LIMITED	UK	2001	2005	1	0	0	1	0

Case	Comp	Nation	Start	End	Conv	DOJ	EC	CC	Others
Mobile (Cell) Phone Operators, NL	VIVENDI SA	FR	1997	2003	1	0	1	0	0
Music downloading services, US	VIVENDI SA	FR	2004	2008	2	1	0	0	0
Cell Phone Rates, IT	VODAFONE GROUP SERVICES LIMITED	UK	1998	1999	1	0	1	0	0
Mobile (Cell) Phone Operators, NL	VODAFONE GROUP SERVICES LIMITED	UK	1997	2003	2	0	1	0	0
Mobile Phone roaming fees, UK	VODAFONE GROUP SERVICES LIMITED	UK	2001	2005	3	0	0	1	0
Mobile phone roaming fees, UK & DE	VODAFONE GROUP SERVICES LIMITED	UK	2001	2005	4	0	1	1	0
New cars	Volkswagen AG	UK	2000	2005	0	0	0	1	0
Supermarkets	WAITROSE LIMITED	UK	2000	2005	1	0	0	1	0
Dairy products (milk, butter, UK cheese), UK	WAL-MART LN (UK) LIMITED	UK	2002	2003	1	0	0	1	0
Snap buttons, rivets, and other non-zipper fasteners 1	YKK EUROPE LIMITED	UK	1991	2000	2	1	1	0	0
Snap buttons, rivets, and other non-zipper fasteners 2	YKK EUROPE LIMITED	UK	1998	1998	1	1	1	0	0

Appendix 2: Cartel Cases and Firms Industries classifications

		Cartel cases		Cartel firms	
SIC	**Industries**	**Initial sample**	**Cartel cases**	**Initial sample**	**Cartel firms**
692	Accounting, and auditing activities	1	1	4	4
731	Advertising	1	0	11	0
511	Air Delivery	8	2	55	10
244	Aluminium	3	0	18	0
477	Antiques (retail)	2	0	11	0
641	Bank and Financial Service	9	0	44	0
110	Beverages - Wineries & Distillers	10	0	32	0
235	Cement	8	0	38	0
201	Chemical	46	9	264	22
244	Copper production	5	2	29	6
463	Dairy Product	8	1	48	4
262	Data Storage Devices	1	0	10	0
321	Diamonds	3	0	6	0
477	Drug Distribution	2	1	9	1
211	Drug Manufacturers	22	1	118	6
275	Electronic Equipment	9	0	37	0
742	Film Manufacturing	2	0	22	0
463	Food - Major Diversified	9	1	62	9
21	Forest Enterprises	1	0	3	0
352	Gas Distribution	12	3	72	13
236	General Building Materials	13	2	78	5
421	General Contractors	3	0	23	0
464	General Entertainment	2	1	9	4
231	Glass Manufacture	2	0	8	0
282	Heavy Construction	11	0	62	0
551	Hotel	1	1	6	1
192	Independent Oil & Gas	18	3	69	4
432	Industrial Electrical Equipment	4	1	29	3
651	Insurance	4	1	35	3
612	Internet Service Providers	1	0	6	0
309	Manufacture of motorcycles	1	0	5	0
201	Manufacture/Rubber	1	0	18	0
466	Manufacturing Building machinery	2	0	6	0
463	Meat Product	1	0	6	0
279	Mechanical Products	1	1	6	1
325	Medical Appliances & Equipment	7	2	31	2
619	Mobile Telephone Services	7	4	22	11
182	Multimedia & Graphics Software	3	2	20	4
171	Paper Manufacture	8	0	63	0
211	Pharmaceutical	3	0	9	0
201	Plastic/ Industrial	7	1	64	2
261	Power & Distribution	3	0	10	0
451	Sale of new cars and light motor vehicles	7	2	49	14
502	Shipping	12	0	110	0
782	Staffing & Outsourcing Services	1	0	4	0
241	Steel & Iron	6	2	62	4
612	Telecommunication	6	0	19	0
133	Textile Industrial	6	6	33	13
120	Tobacco	2	0	6	0
324	Toys & Games	3	1	13	3
351	Transmission of electricity	6	0	52	0
493	Transport	1	1	3	1
360	Utility Services	2	0	12	0
471	Wholesale Products	7	0	54	0
162	Wood Production	1	0	6	0
	Total	**325**	**52**	**1901**	**150**

Appendix 3: Matching cartel firms with non-cartel firms

Case	Comp	Peer1	Peer2	Peer3
Copper plumbing fittings	Aalberts	SUMATRA COPPER & GOLD PLC		
Steel, Flat Stainless	Acerinox SA	RAINHAM STEEL COMPANY LIMITED		
Copper plumbing fittings	Advanced fluid Connections	PRIMARY RESOURCES LIMITED		
Gasoline, Retail, Czech Republic	AGIP	VALVOLINE OIL COMPANY LIMITED		
Airlines, cargo, fuel surcharge	AIR ATLAS LIMITED	RYANAIR LIMITED	FIRST CHOICE HOLIDAYS & FLIGHTS LIMITED	
Airlines, cargo, fuel surcharge	Air France-KLM	NAVTECH (UK) LIMITED		
Airlines, passenger, fuel surcharge	Air France-KLM	NAVTECH (UK) LIMITED		
Compressed industrial and medical gases in I	Air Liquide	INEOS FLUOR LIMITED		
Gases, medical oxygen, AR	Air Liquide	INEOS FLUOR LIMITED		
Gases, medical oxygen, one rigged bid, CL	Air Liquide	INEOS FLUOR LIMITED		
Compressed industrial and medical gases in I	Air Products	ARCH UK BIOCIDES LIMITED		
Airlines, cargo, fuel surcharge	AirCanada	Delta Air Lines, Inc		
Airlines, passenger, fuel surcharge	AirCanada	Delta Air Lines, Inc		
Pharmaceuticals, generic, Brazil	Akzo Nobel NV	GENUS PHARMACEUTICALS LIMITED		
Supermarkets	Aldi	GLANBIA INVESTMENTS LIMITED		
Thread, automotive, EU	AMANN UK LIMITED	GUILFORD MILLS EUROPE LIMITED		
Construction, air conditioning systems,AU	AMEC P L C	MITIE ENERGY LIMITED		
Music downloading services, US	APPLE OPERATIONS INTERNATIONAL	ZAPF CREATION (UK) LIMITED		
Toys & Games. UK	ARGOS LIMITED	HOME SHOPPING DIRECT LIMITED		
Dairy products (milk, butter, UK cheese), UK	ARLA FOODS LIMITED	AN BORD BAINNE LIMITED		
Supermarkets	ASDA STORES LIMITED	MARKS AND SPENCER GROUP P.L.C.		
Insurance premiums, non-life, Italy	ASSICURAZIONI GENERALI-SOCIETA PER A	Banco Bradesco SA		
Antiseptics & disinfectants, IT	AstraZeneca PLC	SUZUKEN CO., LTD.		
Pharmaceuticals, generic, Brazil	AstraZeneca PLC	SUZUKEN CO., LTD.		
New cars	BMW (UK) LIMITED	PENDRAGON PLC		
Distribution, pharmaceuticals, CZ	BOOTS (ALLIANCE BOOTS HOLDINGS LIMITED)	AAH Pharmaceuticals Ltd.		
Gasoline, Retail, Motorway Stations, France	BP (UK) POWER HOLDINGS LIMITED	Genzyme Corporation		
Gasoline, Retail, Spain	BP (UK) POWER HOLDINGS LIMITED	Genzyme Corporation		
Plasterboard	BPB LIMITED	AMG RESOURCES LIMITED		
Radiological Contrast Media, Non-Ionic, IT	BRACCO UK LIMITED	SCHERING-PLOUGH PHARMACEUTICALS (IRELAND) LIMITED		

Appendix 3-Continue

Case	Comp	Peer1	Peer2	Peer3
Marine hose (bid rigging vs. petrol. cos.& N	BRIDGESTONE CORPORATION	Sumitomo Rubber Industries		
Pharmaceuticals, generic, Brazil	BRISTOL - MYERS SQUIBB PHARMACEUTICALS	TEVA PHARMACEUTICAL INDUSTRIES LIMITED		
Zinc phosphate	BRITANNIA ALLOYS & CHEMICALS LIMITED	BRITANNIA ZINC LIMITED		
Airlines, cargo, fuel surcharge	BRITISH AIRWAYS PLC	RYANAIR LIMITED		
Airlines, passenger, fuel surcharge	BRITISH AIRWAYS PLC	RYANAIR LIMITED		
Carbonated Drinks	BRITVIC HOLDINGS LIMITED	BOTTLING GREAT BRITAIN LIMITED		
Supermarkets	BUDGENS STORES LIMITED	BOTTERILLS CONVENIENCE STORES LIMITED		
Carbonated Drinks	CADBURY SCHWEPPES P.L.C.	BOTTLING GREAT BRITAIN LIMITED		
Airlines, cargo, fuel surcharge	CATHAY PACIFIC AIRWAYS LIMITED	NAVTECH (UK) LIMITED	CHINA AIRLINES LIMITED	
Airlines, passenger, fuel surcharge	CATHAY PACIFIC AIRWAYS LIMITED	NAVTECH (UK) LIMITED	CHINA AIRLINES LIMITED	
Oxo-Alcohols (butanols, propyls, hexanols, dioctyl phthalate, phthalic anhydride)	CELANESE CHEMICALS UK LIMITED	DEIF (UK) LIMITED		
New cars	CITROEN U.K. LIMITED	JARDINE MOTORS GROUP UK LIMITED		
Construction, air conditioning systems,AU	CMS ENERGY UK LIMITED	MINING MINERALS CORPORATION LIMITED		
Carbonated Drinks	Coca-Cola & Schweppes Beverages Ltd	AG Barr PLC		
Gasoline, Retail, Czech Republic	CONOCOPHILLIPS PETROLEUM COMPANY U.K. LIMITED	TOTAL E&P UK LIMITED		
New cars	DAIMLER UK PUBLIC LIMITED COMPANY	IBC VEHICLES LIMITED		
Dairy products (milk, butter, UK cheese), UK	DAIRY CREST FOODS LIMITED	PEPPERCOM UK LIMITED		
Auditing Services, IT	DELOITTE MCS LIMITED	TECHNIFORM (ENGINEERING) LIMITED		
Copper plumbing fittings	DELTA PUBLIC LIMITED COMPANY	Resonance Health Limited		
Marine hose (bid rigging vs. petrol. cos.& N	DUNLOP OIL & MARINE LIMITED	WEST PHARMACEUTICAL SERVICES CORNWALL LIMITED		
Pharmaceuticals, generic, Brazil	Eli Lilly & Co.	SUZUKEN CO., LTD.		
Music downloading services, US	EMI GROUP (S&E) LIMITED	MURPHY LIMITED		
Recorded Music, IT	EMI GROUP (S&E) LIMITED	MURPHY LIMITED		
Construction, air conditioning systems,AU	ENVAR LIMITED	PACKO - BLACKWATER LIMITED		
Auditing Services, IT	ERNST & YOUNG LIMITED	NEW MILTON CONCRETE LIMITED		
Fuel, Aviation,IT	EXXONMOBIL CHEMICAL LIMITED	VICTREX PLC		
Gasoline, Retail, Motorway Stations, France	EXXONMOBIL CHEMICAL LIMITED	VICTREX PLC		
New cars	FIAT GROUP AUTOMOBILES UK LTD	SCANIA (GREAT BRITAIN) LIMITED		

Appendix 3-Continue

Case	Comp	Peer1	Peer2	Peer3
Insurance premiums, non-life, Italy	FONDIARIA (UK) HOLDINGS LIMITED	METLIFE EUROPE LIMITED		
New cars	FORD MOTOR COMPANY LIMITED	STRIPESTAR LIMITED		
Mobile (Cell) Phone Operators, NL	FRANCE TELECOM UK	TALKTALK TELECOM HOLDINGS LIMITED		
Drugs, generic (warfarin, penicillin, and anti-u	Goldshield Group Limited	BARD PHARMACEUTICALS LIMITED		
Toys & Games. UK	HASBRO'S BIG PLAY LIMITED	Grattan Plc		
New cars	HEIDI CAR (UK) LIMITED	STRIPESTAR LIMITED		
Carbon Fiber	HERCULES GROUP PLC	HUNTSMAN INTERNATIONAL EUROPE LIMITED		
Carbon Fiber	HEXCEL (U.K.) LIMITED	Zoltek Companies, Inc		
Thread, industrial in UK	HICKING PENTECOST PLC	Concord Fabrics, Inc	HANRO THREAD LIMITED	
New cars	HONDA MOTOR EUROPE LIMITED	STRIPESTAR LIMITED		
IT services tenders, Episode 1, HU	IBM IRELAND INFORMATION SERVICES LIM	VISION HOLDINGS LIMITED		
Supermarkets	ICELAND FOODS LIMITED	FARMFOODS LIMITED		
Copper plumbing fittings	IMI GROUP LIMITED	Namasco Corporation		
Antiseptics & disinfectants, IT	INTERNATIONAL MEDICAL SERVICES LIMITED	THE ROSTHERNE STRATHEARN AND COTTESLOWE TRADING COMPANY LIMITED		
Antiseptics & disinfectants, IT	INTERNATIONAL PA COMPANY LIMITED	NAPP LABORATORIES LIMITED		
Drugs, generic (warfarin, penicillin, and anti-u	IVAX PHARMACEUTICALS LIMITED	BR PHARMA INTERNATIONAL LIMITED		
Auditing Services, IT	KPMG AUDIT PLC	BDO LLP LIMITED		
Plasterboard	LAFARGE PLASTERBOARD HOLDINGS LIMITED	ELECO TIMBER FRAME LIMITED		
Butyl & polybutadiene synthetic rubber, EU	LANXESS LIMITED	APPLIED BIOSYSTEMS LIMITED	ITT Industries Limited	Stadium Group PLC
Toys & Games. UK	LITTLEWOODS GAMING LIMITED	Amazon LTD		
Insurance premiums, non-life, Italy	LLOYDS TSB BANK PLC	METLIFE EUROPE LIMITED		
Plastic bags/sacks, industrial	LOW & BONAR PUBLIC LIMITED COMPANY	PLASTIC BAGS AND PACKAGING LIMITED		
Antiseptics & disinfectants, IT	MEDA PHARMACEUTICALS LIMITED	NAPP LABORATORIES LIMITED		
Copper Concentrates	MIM HOLDINGS LIMITED	COPPERSMITH PLUMBING SERVICES LIMITED		
Mobile (Cell) Phone Operators, NL	mm02 PLC	Yes Telecom		
Mobile phone roaming fees, UK & DE	mm02 PLC	Yes Telecom		
Carbon and Graphite Electrical and Mechanic	MORGANITE CRUCIBLE LIMITED	MONOCON INTERNATIONAL REFRACTORIES LIMITED	Minteq UK Limited	
Dairy products (milk, butter, UK cheese), UK	MORRISON FOODS LIMITED	MARKS AND SPENCER GROUP P.L.C.		
Supermarkets	NETTO FOODSTORES LIMITED	MARKS AND SPENCER GROUP P.L.C.		
New cars	NISSAN MOTOR (GB) LIMITED	PENDRAGON PLC		

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Case	Comp	Peer1	Peer2	Peer3
Steel Tubes, Seamless ("Line Pipe" or "Oil-Country Tubular Goods")	NKK BUILDING SERVICES LIMITED	BAT METALWORK LIMITED		
Blood products, Brazil	OCTAPHARMA LIMITED	Baker & Taylor (Uk) Ltd	Forbo-Nairn Limited	TRAGO MILLS LIMITED
Antiseptics & disinfectants, IT	OMEGA PHARMA UK	SHIONOGI IRELAND LIMITED		
Drugs, generic (warfarin, penicillin, and anti-u	OPD CARTONS LIMITED	ABC DRUG STORES LIMITED		
Mobile Phone roaming fees, UK	ORANGE RETAIL LIMITED	RAYTHEON SYSTEMS LIMITED		
Mobile phone roaming fees, UK & DE	ORANGE RETAIL LIMITED	RAYTHEON SYSTEMS LIMITED		
New cars	PEUGEOT MOTOR COMPANY PLC	BRISTOL STREET FIRST INVESTMENTS LIMITED		
Antiseptics & disinfectants, IT	PLASMASELECT UK LIMITED	Beckman Coulter		
Auditing Services, IT	PRICEWATERHOUSECOOPERS AUDIT COMPANY LIMITED	BDO LLP LIMITED		
Animal Waste	PROSPER DE MULDER LIMITED	CROWN PET FOODS LIMITED	Butcher's Pet Care Limited	
Sewing needles, pins, zippers, fasteners, and other hard tailoring supplies	Prym Group	Eliza Tinsley		
Snap buttons, rivets, and other non-zipper fa	Prym Group	Eliza Tinsley		
Snap buttons, rivets, and other non-zipper fa	Prym Group	Eliza Tinsley		
Zippers	Prym Group	Eliza Tinsley		
New cars	PSA Peugeot Citroen	SCANIA (GREAT BRITAIN) LIMITED		
Marine hose (bid rigging vs. petrol. cos.& Na	PW CONSULTING (UK) LIMITED	YOKOHAMA H.P.T. LIMITED		
Sewing needles, pins, zippers, fasteners, and other hard tailoring supplies	QUANTUM CLOTHING GROUP LIMITED	GUILFORD MILLS EUROPE LIMITED		
Thread, automotive, EU	QUANTUM CLOTHING GROUP LIMITED	GUILFORD MILLS EUROPE LIMITED		
Thread, industrial in UK	QUANTUM CLOTHING GROUP LIMITED	GUILFORD MILLS EUROPE LIMITED		
Thread, industrial, Benelux in UK & Nordic c	QUANTUM CLOTHING GROUP LIMITED	GUILFORD MILLS EUROPE LIMITED		
Zippers	QUANTUM CLOTHING GROUP LIMITED	GUILFORD MILLS EUROPE LIMITED		
Drugs, generic (warfarin, penicillin, and anti-u	RANBAXY (U.K.) LIMITED	Generics Limited		
New cars	RENAULT GROUP U.K. LIMITED	LAND ROVER IRELAND LIMITED		
Copper Concentrates	RIO TINTO PLC	ANTOFAGASTA RAILWAY COMPANY PLC		
Hotels, luxury, central Paris, FR	RITZ HOTEL (LONDON) LIMITED(THE)	PARK TOWER HOTEL LIMITED (THE)		
Dairy products (milk, butter, UK cheese), UK	SAFEWAY FOOD STORES LIMITED	AN BORD BAINNE LIMITED		
Supermarkets	SAFEWAY FOOD STORES LIMITED	GLANBIA INVESTMENTS (IRELAND) LIMITED		
Dairy products (milk, butter, UK cheese), UK	SAINSBURY'S SUPERMARKETS LTD	AN BORD BAINNE LIMITED		
Supermarkets	SAINSBURY'S SUPERMARKETS LTD	GLANBIA INVESTMENTS (IRELAND) LIMITED		

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Case	Comp	Peer1	Peer2	Peer3
Butyl & polybutadiene synthetic rubber, EU	SANOFI-AVENTIS UK HOLDINGS LIMITED	ENI S.P.A.	ARKEMA LTD.	Chevron Corporation
Fuel, Aviation,IT	SANOFI-AVENTIS UK HOLDINGS LIMITED	ENI S.P.A.	ARKEMA LTD.	Chevron Corporation
Gasoline, Retail, Czech Republic	SANOFI-AVENTIS UK HOLDINGS LIMITED	ENI S.P.A.	ARKEMA LTD.	Chevron Corporation
Gasoline, Retail, Motorway Stations, France	SANOFI-AVENTIS UK HOLDINGS LIMITED	ENI S.P.A.	ARKEMA LTD.	Chevron Corporation
Pharmaceuticals, generic, Brazil	SANOFI-AVENTIS UK HOLDINGS LIMITED	ENI S.P.A.	ARKEMA LTD.	Chevron Corporation
Airlines, cargo, fuel surcharge	SINGAPORE AIRLINES LIMITED	CHINA AIRLINES LIMITED		
Compressed industrial and medical gases in I	SOL SPAS LIMITED	KINGSTON MEDICAL GASES LIMITED		
Oxo-Alcohols (butanols, propyls, hexanols, dioctyl phthalate, phthalic anhydride)	SOLVAY INTEROX LIMITED	EVOTEC (UK) LIMITED		
Recorded Music, IT	SONY MUSIC ENTERTAINMENT UK LIMITED	MURPHY LIMITED		
Bus in NE england	STAGECOACH (SOUTH) LIMITED	ARRIVA MERSEYSIDE LIMITED	First Glasgow (No.1) Limited	Go North East Limited
New cars	SUZUKI GB PLC	INCHCAPE FINANCE PLC		
Supermarkets	TESCO HOLDINGS LIMITED	GLANBIA INVESTMENTS (IRELAND) LIMITED		
Dairy products (milk, butter, UK cheese), UK	THE CHEESE COMPANY LIMITED	Westbury Dairies Limited		
Steel, Flat Stainless	THYSSENKRUPP STAINLESS UK LIMITED	TWM METALS LIMITED		
Music downloading services, US	TIME WARNER LIMITED	WOKING TURNSTYLE LIMITED		
Recorded Music, IT	TIME WARNER LIMITED	WOKING TURNSTYLE LIMITED		
Carbon Fiber	TORAY INDUSTRIES INC.	Zoltek Companies, Inc		
Zinc phosphate	TRIDENT ALLOYS LIMITED	Waston		
Plastic bags/sacks, industrial	UPM-KYMMENE (UK) HOLDINGS PLC	Fiberweb Plc		
Steel Tubes, Seamless ("Line Pipe" or "Oil-Country Tubular Goods")	VALLOUREC MANNESMANN OIL & GAS UK LTD.	BAT METALWORK LIMITED		
New cars	VAUXHALL MOTORS LIMITED	LAND ROVER IRELAND LIMITED		
Mobile Phone roaming fees, UK	VIRGIN MOBILE GROUP (UK) LIMITED	Yes Telecom		
Mobile (Cell) Phone Operators, NL	VIVENDI SA	Yes Telecom		
Music downloading services, US	VIVENDI SA	ZAPF CREATION (UK) LIMITED		

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Case	Comp	Peer1	Peer2	Peer3
Cell Phone Rates, IT	VODAFONE GROUP SERVICES LIMITED	TALKTALK TELECOM HOLDINGS LIMITED		
Mobile (Cell) Phone Operators, NL	VODAFONE GROUP SERVICES LIMITED	TALKTALK TELECOM HOLDINGS LIMITED		
Mobile Phone roaming fees, UK	VODAFONE GROUP SERVICES LIMITED	TALKTALK TELECOM HOLDINGS LIMITED		
Mobile phone roaming fees, UK & DE	VODAFONE GROUP SERVICES LIMITED	TALKTALK TELECOM HOLDINGS LIMITED		
New cars	Volkswagen AG	JARDINE MOTORS GROUP UK LIMITED		
Supermarkets	WAITROSE LIMITED	TATES LIMITED		
Dairy products (milk, butter, UK cheese), UK	WAL-MART LN (UK) LIMITED	Robert Wiseman Dairies PLC		
Snap buttons, rivets, and other non-zipper fa	YKK EUROPE LIMITED	PEEL LAND HOLDINGS LIMITED		
Snap buttons, rivets, and other non-zipper fa	YKK EUROPE LIMITED	PEEL LAND HOLDINGS LIMITED		

Appendix 4: Descriptive Statistics of All Firms (Cartel and Non-cartel Firms)

The table reports a descriptive statistics of 150 cartel firms and 178 non-cartel firms. For every cartel firm, a control group of non-cartel firms was created, which share the first three digits of the SIC code and similar firm size based on net sale within ±25% of the cartel firm's sales at the end of the year before the collusive agreement started. Firm-years, in which cartel firms, i.e., firms that at one point in time during our sample period are part of a cartel agreement, are not participating in a cartel, are excluded from this analysis. *Sizeba* is the size of the board pre-cartel formation. *NED%* is the percentage non-executive directors on the board pre-cartel formation. *Ageba* is the age of the board pre-cartel formation. *GENBA %* is the average gender ratio of the board pre-cartel formation. *Durba* is the duration of the board pre-cartel formation. *Remun* is the average board remuneration pre-cartel formation. *OUTOWN %* is the common stock owned by outside directors on the board pre-cartel formation. *FAMCON* is a dummy variable, which equals 1 if the firm is family owned and controlled. *CEOAGE* is computed as the age of the CEO at the starting year of the cartel formation. *CEOTEN* is computed as uninterrupted years on the board of directors up to the year when the cartel started. *CEOGEN* is a dummy variable for both cartel firms and non-cartel firms with value of 1 if CEO was female and 0 if otherwise. *BOSS* is a dummy variable for cartel firms created with a value of 1 if the chair of the board held concentration power of CEO or president and 0 if otherwise. *Multidir* is calculated as the total number of directorship assigned to the CEO on other boards. *Bonus* is calculated as the average three-year CEO bonus. *Share* is calculated as the average three-year CEO shares in the firm. *Tcomp* is calculated as the total average three years CEO compensation in the firm. *HHI* is the Herfindahl-Hirschman Index. *CurrRatioB* is the average of current ratio pre-cartel formation. *PPER* is the average poor financial performance pre-cartel formation. *COSTA* is the firm's ownership status to control for private firms and public firms. *JOIN* is the number of member joined the board during that period. The variables on board and CEO characteristics were obtained from proxy statements with filing dates three years prior to the cartel agreements started.

Category	Obs	Mean	STDV
Independent Variable			
Boards Characteristics			
Board size	328	5.11	3.78
Board Duration	328	2.29	1.49
Board age	328	44.7	10.7
Gender diversity of the board (%)	328	0.08	0.18
Common stock own by outside directors (%)	328	0.70	0.49
Non-Executive director (%)	328	0.07	0.14
Remuneration	250	1.26	9.69
Ownership Structure			
Common stock own by outside directors (%)	328	0.70	0.49
Family-owned and controlled firms	327	0.04	0.20
CEO Characteristics			
CEO tenure	328	10.1	4.80
CEO age	328	47.3	9.98
CEO gender	328	0.10	0.31
Concentration power	328	0.32	0.47
Multidirectorship	328	2.37	2.82
CEO Compensation			
Bonus	92	14.0	33.1
Share	92	4.92	14.1
Total-Compensation	93	49.7	16.2
Control Variables			
Firm ownership	328	0.44	0.49
Sale	321	2.99	32.7
Poor financial performance	295	2.52	26.7
Current ratio pre-cartel	314	1.48	1.12
Herfindahl index	328	0.20	0.18
Join	327	5.67	5.68

Source: Author's own calculation

Appendix 5: Descriptive Statistics for Firms Convicted of Cartel once (CONV=1)

The table reports a descriptive statistics of cartel firms which convicted once, the sample varied between 113 to 28 cartel firms depending on availability of the data. *Sizeba* is the size of the board pre-cartel formation. *NED%* is the percentage non-executive directors on the board pre-cartel formation. *Ageba* is the age of the board pre-cartel formation. *GENBA %* is the average gender ratio of the board pre-cartel formation. *Durba* is the duration of the board pre-cartel formation. *Remun* is the average board remuneration pre-cartel formation. *OUTOWN %* is the common stock owned by outside directors on the board pre-cartel formation. *FAMCON* is a dummy variable, which equals 1 if the firm is family owned and controlled. *CEOAGE* is computed as the age of the CEO at the starting year of the cartel formation. *CEOTEN* is computed as uninterrupted years on the board of directors up to the year when the cartel started. *CEOGEN* is a dummy variable for both cartel firms and non-cartel firms with value of 1 if CEO was female and 0 if otherwise. *BOSS* is a dummy variable for cartel firms created with a value of 1 if the chair of the board held concentration power of CEO or president and 0 if otherwise. *Multidir* is calculated as the total number of directorship assigned to the CEO on other boards. *Bonus* is calculated as the average three-year CEO bonus. *Share* is calculated as the average three-year CEO shares in the firm. *Tcomp* is calculated as the total average three years CEO compensation in the firm. *HHI* is the Herfindahl-Hirschman Index. *CurrRatioB* is the average of current ratio pre-cartel formation. *PPER* is the average poor financial performance pre-cartel formation. *COSTA* is the firm's ownership status to control for private firms and public firms. *JOIN* is the number of member joined the board during that period. The variables on board and CEO characteristics were obtained from proxy statements with filing dates three years prior to the cartel agreements started.

Category	Obs	Mean	STDV
Independent Variable			
Boards Characteristics			
Board size	113	5.10	3.83
Board Duration	113	2.22	1.24
Board age	113	44.3	9.20
Gender diversity of the board (%)	113	0.05	0.15
Non-Executive director (%)	113	0.05	0.15
Remuneration	87	1.49	11.1
Ownership Structure			
Common stock own by outside directors Outown (%)	113	0.73	0.4
Family-owned and controlled firms	112	0.00	0.09
CEO Characteristics			
CEO tenure	113	9.62	4.51
CEO age	113	50.8	8.90
CEO gender	113	0.00	0.09
Concentration power	113	0.50	0.50
Multidirectorship	113	1.58	2.34
CEO Compensation			
Bonus	28	22.1	55.5
Share	28	6.93	19.3
Total-Compensation	29	9.5	28.3
Control Variables			
Firm ownership	113	0.53	0.5
Sale	113	6.01	55.3
Poor financial performance	103	-17.1	16.2
Current ratio pre-cartel	108	1.45	1.09
Herfindahl index	113	0.24	0.21
Join	113	5.33	6.23

Source: Author's own calculation

Appendix 6: Descriptive Statistics for Firms Convicted of Cartel Twice (CONV=2)

The table reports a descriptive statistics of cartel firms which convicted twice, the sample varied between 23 to 12 cartel firms depending on availability of the data. *Sizeba* is the size of the board pre-cartel formation. *NED%* is the percentage non-executive directors on the board pre-cartel formation. *Ageba* is the age of the board pre-cartel formation. *GENBA %* is the average gender ratio of the board pre-cartel formation. *Durba* is the duration of the board pre-cartel formation. *Remun* is the average board remuneration pre-cartel formation. *OUTOWN %* is the common stock owned by outside directors on the board pre-cartel formation. *FAMCON* is a dummy variable, which equals 1 if the firm is family owned and controlled. *CEOAGE* is computed as the age of the CEO at the starting year of the cartel formation. *CEOTEN* is computed as uninterrupted years on the board of directors up to the year when the cartel started. *CEOGEN* is a dummy variable for both cartel firms and non-cartel firms with value of 1 if CEO was female and 0 if otherwise. *BOSS* is a dummy variable for cartel firms created with a value of 1 if the chair of the board held concentration power of CEO or president and 0 if otherwise. *Multidir* is calculated as the total number of directorship assigned to the CEO on other boards. *Bonus* is calculated as the average three-year CEO bonus. *Share* is calculated as the average three-year CEO shares in the firm. *Tcomp* is calculated as the total average three years CEO compensation in the firm. *HHI* is the Herfindahl-Hirschman Index. *CurrRatioB* is the average of current ratio pre-cartel formation. *PPER* is the average poor financial performance pre-cartel formation. *COSTA* is the firm's ownership status to control for private firms and public firms. *JOIN* is the number of member joined the board during that period. The variables on board and CEO characteristics were obtained from proxy statements with filing dates three years prior to the cartel agreements started.

Category	Obs	Mean	STDV
Independent Variable			
Boards Characteristics			
Board size pre-cartel	23	7.73	3.50
Board Duration pre-cartel	23	2.34	1.40
Board age pre-cartel	23	44.8	8.73
Gender diversity of the board (%)	23	0.05	0.11
Non-Executive director (%)	23	0.10	0.19
Remuneration	22	4.81	22.0
Ownership Structure			
Common stock own by outside directors (%)	23	0.82	0.35
Family-owned and controlled firms	23	0	0
CEO Characteristics			
CEO tenure	23	8.21	4.05
CEO age	23	52.2	9.61
CEO gender	23	0.00	0.00
Concentration power	23	0.34	0.48
Multidirectorship	23	2.73	3.15
CEO Compensation			
Bonus	12	21.7	18.6
Share	12	9.64	16.0
Total-Compensation	12	7.03	6.89
Control Variables			
Firm ownership	23	0.78	0.42
Sale	23	17.3	37.7
Poor financial performance	22	-9.99	29.3
Current ratio pre-cartel	23	1.43	0.85
Herfindahl index	23	0.23	0.23
Join	23	5.70	4.90

Source: Author's own calculation

Appendix 7: Descriptive Statistics for Firms Convicted of Cartel Three Times (CONV=3)

The table reports a descriptive statistics of cartel firms which convicted three times, the sample varied between 7 to 4cartel firms depending on availability of the data. *Sizeba* is the size of the board pre-cartel formation. *NED%* is the percentage non-executive directors on the board pre-cartel formation. *Ageba* is the age of the board pre-cartel formation. *GENBA %* is the average gender ratio of the board pre-cartel formation. *Durba* is the duration of the board pre-cartel formation. *Remun* is the average board remuneration pre-cartel formation. *OUTOWN %* is the common stock owned by outside directors on the board pre-cartel formation. *FAMCON* is a dummy variable, which equals 1 if the firm is family owned and controlled. *CEOAGE* is computed as the age of the CEO at the starting year of the cartel formation. *CEOTEN* is computed as uninterrupted years on the board of directors up to the year when the cartel started. *CEOGEN* is a dummy variable for both cartel firms and non-cartel firms with value of 1 if CEO was female and 0 if otherwise. *BOSS* is a dummy variable for cartel firms created with a value of 1 if the chair of the board held concentration power of CEO or president and 0 if otherwise. *Multidir* is calculated as the total number of directorship assigned to the CEO on other boards. *Bonus* is calculated as the average three-year CEO bonus. *Share* is calculated as the average three-year CEO shares in the firm. *Tcomp* is calculated as the total average three years CEO compensation in the firm. *HHI* is the Herfindahl-Hirschman Index. *Saleb* is the average sales pre-cartel formation. *CurrRatioB* is the average of current ratio pre-cartel formation. *PPER* is the average poor financial performance pre-cartel formation. *COSTA* is the firm's ownership status to control for private firms and public firms. *JOIN* is the number of member joined the board during that period. The variables on board and CEO characteristics were obtained from proxy statements with filing dates three years prior to the cartel agreements started.

Category	Obs	Mean	STDV
Independent Variable			
Boards Characteristics			
Board size pre-cartel	7	4.74	1.68
Board Duration pre-cartel	7	2.13	1.67
Board age pre-cartel	7	46.4	5.44
Gender diversity of the board (%)	7	0.04	0.06
Non-Executive director (%)	7	0.00	0.00
Remuneration	7	0.09	0.72
Ownership Structure			
Common stock own by outside directors (%)	7	0.64	0.47
Family-owned and controlled firms	7	0.14	0.37
CEO Characteristics			
CEO tenure	7	7.28	5.40
CEO age	7	49.4	8.10
CEO gender	7	0.00	0.00
Concentration power	7	0.57	0.53
Multidirectorship	7	2.28	2.69
CEO Compensation			
Bonus	4	17.9	21.9
Share	4	20.3	23.5
Total-Compensation	4	41.7	28.4
Control Variables			
Firm ownership	7	0.71	0.48
Sale	7	5.60	10.4
Poor financial performance	7	17.2	63.6
Current ratio pre-cartel	6	1.54	0.49
Herfindahl index	7	0.24	0.21
Join	7	6.14	5.49

Source: Author's own calculation

Appendix 8: Descriptive Statistics for Firms Convicted of Cartel Four Times or More (CONV=4 & more)

The table reports a descriptive statistics of cartel firms which convicted four times and more, the sample varied between 7 to 2 cartel firms depending on availability of the data. *Sizeba* is the size of the board pre-cartel formation. *NED%* is the percentage non-executive directors on the board pre-cartel formation. *Ageba* is the age of the board pre-cartel formation. *GENBA %* is the average gender ratio of the board pre-cartel formation. *Durba* is the duration of the board pre-cartel formation. *Remun* is the average board remuneration pre-cartel formation. *OUTOWN %* is the common stock owned by outside directors on the board pre-cartel formation. *FAMCON* is a dummy variable, which equals 1 if the firm is family owned and controlled. *CEOAGE* is computed as the age of the CEO at the starting year of the cartel formation. *CEOTEN* is computed as uninterrupted years on the board of directors up to the year when the cartel started. *CEOGEN* is a dummy variable for both cartel firms and non-cartel firms with value of 1 if CEO was female and 0 if otherwise. *BOSS* is a dummy variable for cartel firms created with a value of 1 if the chair of the board held concentration power of CEO or president and 0 if otherwise. *Multidir* is calculated as the total number of directorship assigned to the CEO on other boards. *Bonus* is calculated as the average three-year CEO bonus. *Share* is calculated as the average three-year CEO shares in the firm. *Tcomp* is calculated as the total average three years CEO compensation in the firm. *HHI* is the Herfindahl-Hirschman Index. *CurrRatioB* is the average of current ratio pre-cartel formation. *PPER* is the average poor financial performance pre-cartel formation. *COSTA* is the firm's ownership status to control for private firms and public firms. *JOIN* is the number of member joined the board during that period. The variables on board and CEO characteristics were obtained from proxy statements with filing dates three years prior to the cartel agreements started.

Category	Obs	Mean	STDV
Independent Variable			
Boards Characteristics			
Board size	7	7.85	3.07
Board Duration	7	2.70	0.97
Board age	7	45.48	5.79
Gender diversity of the board (%)	7	0.06	0.10
Non-Executive director (%)	7	0.03	0.08
Remuneration	7	0.13	0.13
Ownership Structure			
Common stock own by outside directors (%)	7	0.64	0.47
Family-owned and controlled firms	7	0	0
CEO Characteristics			
CEO tenure	7	7.00	3.16
CEO age	7	50.70	6.89
CEO gender	7	0.00	0.00
Concentration power	7	0.28	0.48
Multidirectorship	7	1.71	2.36
CEO Compensation			
Bonus	2	30.43	27.67
Share	2	20.38	28.82
Total-Compensation	2	57.66	8.54
Control Variables			
Firm ownership	7	0.57	0.53
Sale	7	5.32	10.56
Poor financial performance	7	-21.27	45.30
Current ratio pre-cartel	7	1.46	0.58
Herfindahl index	7	0.15	0.40
Join	7	6.28	5.19

Source: Author's own calculation

Appendix 9: CEO and Board Risk Matrix